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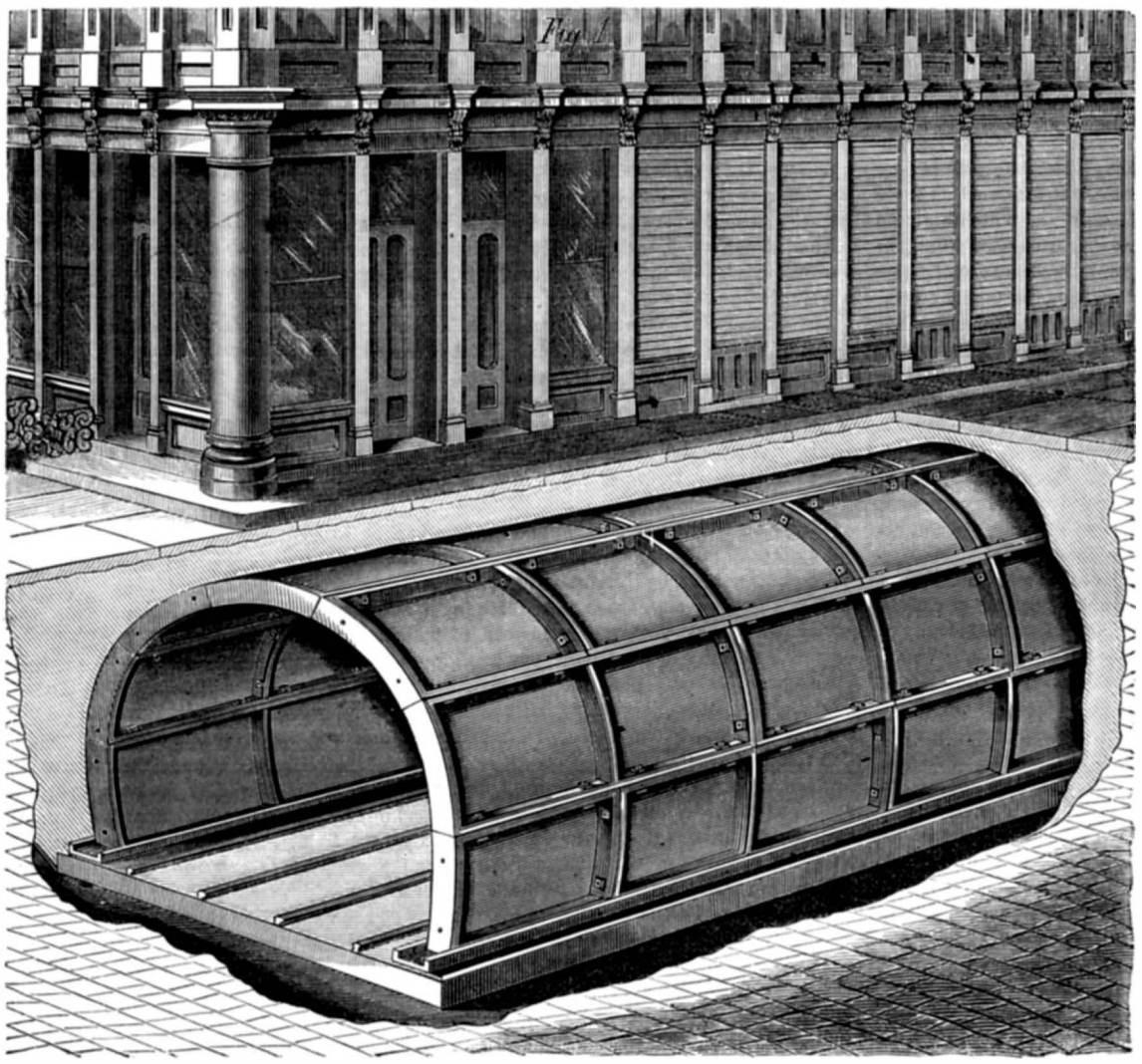
Method of Constructing Tunnels, Vaults, Etc.

The problem how to relieve the city of its over-crowded population, how to extend its cramped proportions to the upper end of the island of Manhattan, how to connect it by rapid and low-priced means of communication with the neighboring shores of Long Island and New Jersey, and how to provide comfortable and cheap homes in its vicinity for its myriad sons of toil, who labor ceaselessly to enrich grasping landlords, and who pass their hours of rest in dwellings which are a disgrace to a civilized age, is one which interests every humanitarian, every capitalist, and every lover of the city's prosperity, almost as deeply as the numerous class which is more immediately benefited by its solution.

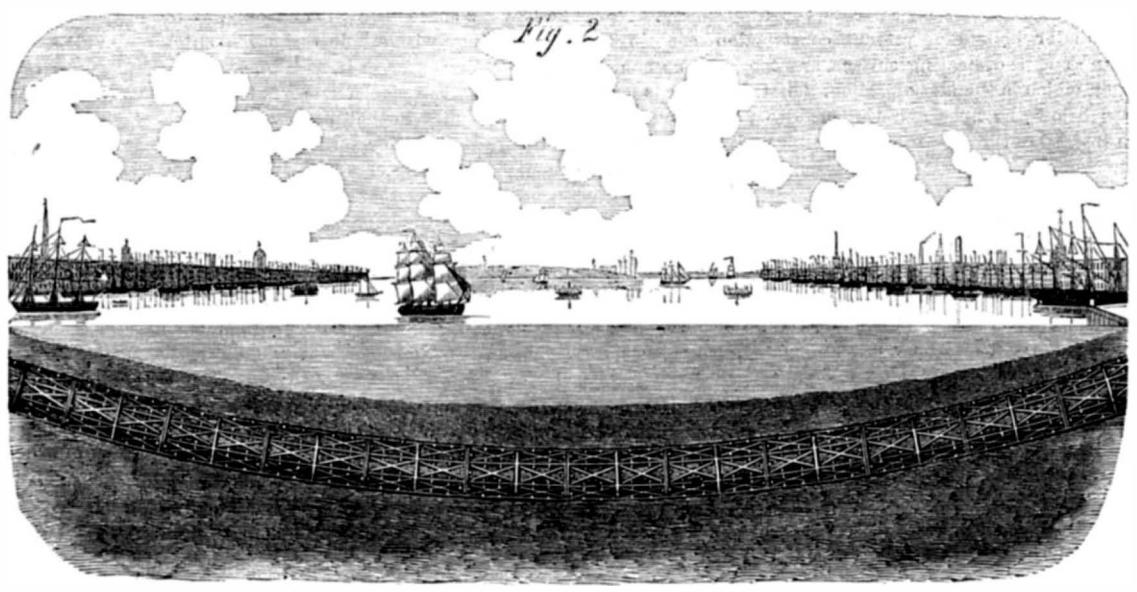
Railroads—aerial, pneumatic, and underground—to supersede the tedious horse cars, and bridges as a substitute for ferryboats have been proposed. A commission, consisting of three Senators, the Mayor of the city, the State Engineer, and the Engineer of the Croton Aqueduct Board was appointed to sit during the recess of 1866, and inquire into the best means of affording the much-needed rapid transportation. They advertised largely and received a great number of plans and suggestions embracing every description of railroad. After giving the matter a thorough investigation they reported to the Legislature last January recommending, unanimously, the underground railroad as superior to all other methods for this island. Notwithstanding this report and the numerous petitions of owners and lessees of property in favor of the measure, the Legislature refused to grant a charter to any of the numerous applicants owing to dissensions among the parties applying—the only measure of relief (?) granted was the authority given to construct two bridges across the East River, which cannot be completed in several years. The time, however, will come when public opinion will demand the adoption of all the methods that can be made available and then the plan recently patented by Mr. Joseph Dixon, and illustrated in the accompanying engravings, will undoubtedly meet with the success its simplicity, economy, and adaptability for the underground and pneumatic systems deserve.

In applying Mr. Dixon's method to underground railways the excavation is made as usual with the exception that a much narrower trench will be needed to accommodate the iron plates forming the sides in place of stone or brickwork. A foundation of stone is then placed to which the side plates are bolted, and the plates forming the arch are first placed on a movable framework and bolted to each other. The framework being made so as to be raised or lowered by means of a screw jack, will be raised slightly above the sides while the flanges of the arch plates are being bolted together, and when ready the framework will be lowered till the arch rests in its place on the sides. A section is now complete, the center plate acting as the key, and every joint answering as a powerful strengthening rib, and being tongued and grooved and packed with cast iron or other cement, will be perfectly watertight. The means of ventilation will be through iron air shafts rising in the form of an obelisk or column of open lattice work and surmounted by lamps to be used in place of the present street lamps.



DIXON'S MODE OF CONSTRUCTING TUNNELS, VAULTS, ETC.

For constructing the pneumatic railway Mr. Dixon's method will equally well apply where the tube is of sufficient diameter to contain the carriages and in which they are propelled by the direct expansion of the air, the ease with which the parts are put together, their comparative cheapness in cost, the facility with which they may be handled and transported to the place required, render it incomparably superior to every other method of tubing hitherto employed.



For a submarine tunnel this method stands pre-eminent. As before remarked, the bridges about to be constructed across the East River will take several years to complete, one of them at an estimated cost of $8,000,000; for this sum several tunnels, each affording as much facility for traffic as a bridge, could be laid across the East and North Rivers, and not one of them need occupy over a year in constructing.

For vaults under sidewalks, such as are used by the large newspaper establishments, and by dry-goods stores, breweries, etc., this system can be advantageously applied and the size of the vaults largely increased by substituting the iron plates for the thick stonework and brickwork generally used

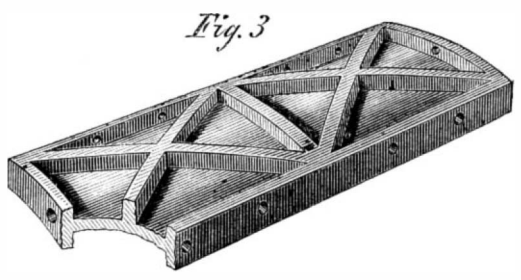
In the construction of tunnels where the engineer is forced to drift through a loose soil, the advantages of arches formed of these iron plates with the joint inside, are too apparent to require any thing more than a mere mention.

This device was patented August 20, 1867, through the SCIENTIFIC AMERICAN office, by Joseph Dixon, 119 Broadway (Rooms 34 and 35), who will give further information.

Quinine.

Among the many remedial agents which organic chemistry has afforded us, quinine occupies the first place, chloroform the second. Without quinine, large tracts, indeed whole countries, would be simply uninhabitable for Europeans. To the backwoodsman a supply of quinine is as important as gunpowder. The "quinine famine' in the Mauritius demonstrated to thousands how small a thing even gold itself might become in comparison with this life-saving salt.

If the search for artificial quinine has been as unsuccessful as that for the Philosopher's Stone, it has at least resulted also in some great discoveries. It does not appear to be generally known that the first of the analine colors was discovered during a search for artificial quinine! But, tired of waiting for that which did not come, finding that chemists could not produce quinine, it struck certain minds that it would be a surer plan to assist Nature a little, and Nature, as she always does when properly called upon, responded liberally. In effect, owing to the wasteful and ignorant manner in which bark was collected in its old habitat, it was, especially in the finer and richer varieties, getting scarcer. This circumstance has induced certain enterprising men to cause the cinchonas to be introduced into India, and it has not only been found that the change of habitat does not prevent the developement of quinine, but the valuable discovery has been made by McIvor, and confirmed by DeVrij, that covering the bark during its growth with moss increases the percentage of alkaloids. The cinchona plantations in India are now so flourishing that there need be no apprehension of the supply of quinine ever failing, and if the discovery of artificial quinine should ever now be made, it would have to depend upon its cheapness for its value. We are aware that the discovery of artificial quinine has more than once been announced, but up to the present time such announcements have never been supported by positive evidence.—*Chemical News.*



Lead Floating on Molten Iron.

Some experiments have been made in Germany which seem to show that molten lead when dropped upon liquid iron remains floating on the surface of the latter. As the specific gravity of lead (11.5) is more than one half greater than that of cast iron (7), there arose some discussion on this subject which has been recently closed in a very satisfactory manner

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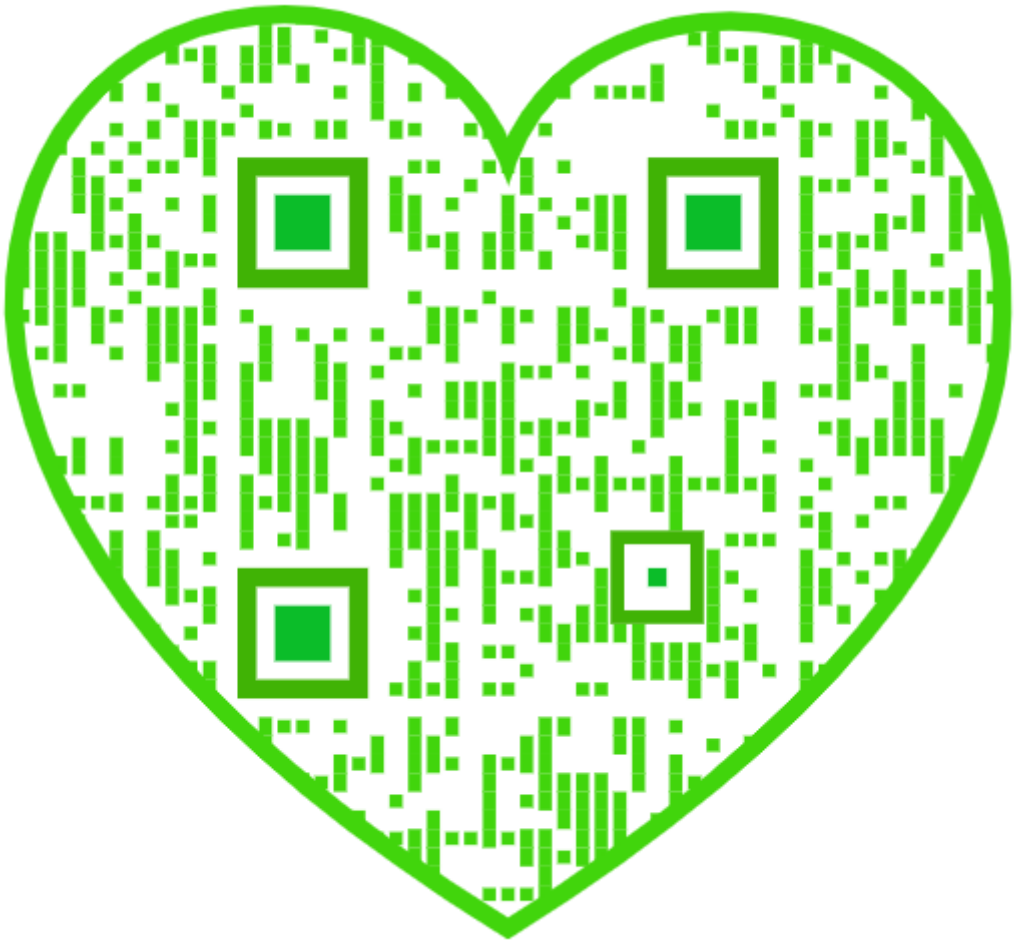

by the researches of Professor Karmarsch, of Hanover. An ironmaster in the vicinity of that town had sent to the professor some samples of such drops of lead lying imbedded in the surface of a cast-iron block, and which had been produced in the manner above described. Professor Karmarsch found, upon close examination, that these drops of lead, instead of being solid globules, as was supposed at first sight, were all hollow, forming bubbles composed of a metallic skin, and apparently empty in the center, so far as his observation has been carried. He explains the whole by supposing that the molten lead, at the temperature to which it is raised by the contact with liquid iron, forms an incipient vapor of lead, which is prevented from escaping by the skin of solidifying metal which forms on the top. The lead vapor, according to this explantion, keeps the lead resting upon the surface of the iron. It seems that in large quantities the result is different, since it is known that lead is occasionally tapped from the bottom of blast furnaces, which smelt certain classes of ores containing lead, and in these cases the lead is found below the liquid iron, according to its greater specific gravity. —*Engineering.*

CAUSES OF STEAM BOILER EXPLOSIONS. UNSAFE CHARACTER OF TUBULAR BOILERS.

A correspondent of the Lancaster (Pa.) *Express* writes to that paper as follows:

"I have read the published testimony taken before the coroner's jury, and have been waiting anxiously to hear something said in regard to the recent explosions and disasters on our western rivers. No person seems to know or to remember that the Atlantic and Mississippi Steamship Company lost six of the finest Mississippi steamers that floated on those waters, by explosion, last spring (1866), all of which blew up in succession within a space of about three months; that this company caused an investigation into the cause of these almost simultaneous explosions. I have not seen any official report of the company's investigating corp of engineers; but I have talked with some of their captains and engineers on the subject. I talked with the captain of the steamer *Missouri*, a few hours after it blew up, six miles above Evansville, Ind., on the Ohio river; I have conversed at different times with their engineers and others posted in the investigations, and I have learned that the following is the substance of their investigations; although I would recommend that the coroner make an effort to get an official copy of their report:

"'That the tubular boilers are condemned as an unsafe and dangerous arrangement. That the tubular boilers are made with a view to economy in the saving of fuel, which is the real cause of their introduction; but the damage done by explosion is in no way equaled by the economy, say nothing of the loss of life; that steam is the decomposition of water, by being brought in contact with heat; that steam, if brought in contact with fire, is itself converted into an explosive gas, which no known substance can confine. That it requires a certain and fixed quantity of water to a given amount and intensity of heat, and a certain capacity of fire surface to prevent such a heat on the steam in the boilers as to produce this explosive gas. That it is impossible for a sound boiler to explode from the mere pressure of steam. That when the heat becomes so intense as to produce explosive gas, the water in the boiler is inadequate to prevent the accumulation of gas. That mere steam will not explode a sound boiler; that when a boiler is pressed by heat beyond its capacity, explosive gas is generated. That tubular boilers have a larger amount of fire surface, proportioned to the quantity of water they contain, than any other boilers; the amount of heating surface is too great to insure safety. That if the water by accident, negligence, or by being drawn from one boiler to another, falls below one or more tier of tubing, and a hot current of flame passes through the upper tubes, the steam is rapidly converted into gas, and if an explosion does not follow, it is because the process of generating gas is arrested by increasing the water, or cooling down the fire before a quantity of gas is generated to make a breach in the iron. During the last year, upward of thirty explosions have taken place, which were spontaneous explosions, and all of them that were heard from were tubular boilers, and in the same time in the United States, every locomotive boiler which has exploded spontaneously, was of the tubular arrangement. Locomotives having only a single boiler, the theory that the water was drawn from one boiler into another, will not apply. But the theory is that the amount of fire surface aided by the powerful draft of a locomotive in motion, capable of converting steam into gas exceeding the power of water to prevent generating such gas, will cause an explosion on the same principle. That before the invention of the safety valve, boiler explosions were so numerous that steam power was denounced as a failure, prohibited in some countries, and the machines destroyed by mobs in some places. But after the invention of the safety valve, and as long as the small single tube, cylinder boilers were used, explosions were rare, and unaccountable explosions seldom known; most of them could be traced to some neglect, carelessness, ignorance, inattention, incapacity, drunkenness, or design on the part of those having charge of an engine.'

"The same causes which exploded boilers in the early age of steam explode them now, for nature is always the same; no law has changed. But here in America, on water and land, are a succession of explosions falling fast one upon another during a single year, with a destruction of property amounting to millions, and a loss of thousands of human lives, and in no instance has it been shown that any of the duties of the engineer were neglected, or any of the ordinary causes in any way were connected with these mysterious explosions.

"The question here arises, what is the cause? If no law of nature has changed, if the law of explosion is the same now that it was when the small, single tube, cylinder boilers were in use, for a third of a century, what is the cause of this recent accumulation of explosions? Manifestly if no change has taken place in nature, then the change must be in the changed construction of boilers.

"After the invention of the safety valve, the intelligent and cautious engineer trusted with confidence in the familiar sound of steam escaping from the safety valve to warn him of danger. But now the safety valve is unreliable, and even the water gage is treacherous. On the *Missouri*, which blew up in April, 1866, the engineer tried the water not five minutes before the explosion, and found it all right. All the ordinary means of guarding against explosions and assuring safety in the use of steam power, which for a quarter of a century or more were as reliable and safe as any means used to guard against accidents in the employment of any other dangerous and useful element have recently become uncertain, treacherous, and unreliable. Again we repeat the question, Why is this? and what is the cause?

"If we were to answer, we should say that mechanics, in the effort to construct a boiler to do the greatest amount of work with the least cost of fuel, have sacrificed safety to economy. When steam power was introduced the country abounded with wood, the best fuel for making steam; but as wood became scarce and high, fuel-saving machines were largely in demand. But no saving of fuel in generating steam can be accomplished except by increasing the fire surface in or around the boiler, with parallel flues through which a current of flame or heat passes several times over the water surface, thus retaining longer around the boiler the heat generated; while combustion is more perfect and the inflammable gas, the product of combustion, being longer retained within the reach of a flame, ignites and burns, where in a single flue it would pass unignited, without heating, out of the chimney. Even smoke is inflammable gas, and if this gas is all ignited, no smoke, nothing but a current of heated air would pass through the chimney.

"This principle of saving fuel, and still generating the required amount of heat, has proved a grand success in this country in stoves and heating furnaces. But it has proved a success in the generating of heat only, and not in generating steam.

"Boiler makers, when they applied this principle in generating steam, lost sight of the fact that when they increased the heating surface, the intensity and quantity of heat around a boiler, that they ought also to increase in an adequate proportion the quantity of water; instead of which, however, they have actually increased the power of the fiery element, and lessened the only power, water, capable of holding this fiery monster in subjection, which would be equivalent to running an ordinary one flue cylinder boiler on half water, with full heat.

"This, then, we conceive to be the true cause of the recent explosions in this country. Let it be understood by mechanics, that throughout all nature, in every element or living substance, organic or inorganic, a positive and a negative principle exists. That the positive is the active, moving, living power, while the negative is the passive power acted upon. That fire is a positive element, and water in a boiler becomes its negative, but when the water becomes sufficiently decomposed, a new element is created, which is a positive principle, and the atmosphere is its negative, and the attraction of this negative (the atmosphere) for the positive principle in the boiler when it becomes positive by decomposition of water, is so great, that no substance can hold it from escaping. The atmosphere cannot go into the boiler; if it could there would be no explosion, so the contents of the boiler seek the atmosphere.

"Hence it follows that there is always safety in the use of steam, provided that that only element of safety, *water*, shall exceed the heating power, *fire*, so as always to predominate, and that no fire shall pass over a steam surface to decompose the steam and convert it into explosive gas, which means a positive element whose negative is the atmosphere. Now, these tubular boilers of present construction contain too great an amount of heating surface, and too small a quantity of water, which is the first objection. That the water is liable to pass below the flues and the heat to pass through the steam instead of through the water, thus rarifying the steam and increasing its elasticity, is another and very serious objection. It is believed from various experiences, that boilers constructed of the same thickness of metal, one foot instead of four in diameter, will exceed the large boiler in resisting power fifty per cent. From the investigations of the Mississippi and Atlantic Steamship Company, I deduce the following conclusions: That the present arrangement of tubular boilers affords too great an amount of heating surface for their capacity for water; that by accident or neglect the water is liable to sink below the upper tier of tube flues, in which case the flues become hotter than they would if covered with water, and decompose or rarify the steam creating, if the tubes get hot enough and continue long enough out of water, and an explosive power, not steam, that iron is unable to confine. It is impossible to avoid explosions while the fire may, by accident or neglect, or by emptying one boiler into another, reach the steam surface, and rarify the steam.

"In making boilers, the engineer should enter into a mathematical calculation, ascertaining by experiment on a small scale the quantity of water to a given amount of heating surface, and intensity of heat necessary to prevent explosion; then when heating surface is increased by any arrangement of parallel flues, let the capacity for water be increased in a corresponding ratio. Let the boiler be so arranged as to render it absolutely impossible for the fire surface to reach the steam surface. With such an arrangement, with the steam gage, the water cock and safety valve, with sound and well-constructed boilers, with proper care and attention, it is the opinion of some of the most intelligent and best educated engineers in America, that there need be no explosions, at least spontaneous explosions.

No ship-builder on southwestern rivers will touch a tubular boiler any more, and insurance companies charge higher rates for insuring boats containing them. The object aimed at in tubular boilers being economy in fuel, and retention of heat around the boiler, need not be abandoned. I saw in the West a set of boilers, six in number, placed upright, twelve inches in diameter, and ten feet high, placed three on either side of a hollow fire chamber. The fire was allowed to pass to the hight of low water in the boilers, then down and under and up on the opposite side of the boilers, to the hight of low water, and out into the chimney flue. Through the hollow casing, around the fire chamber, a current of cold air was admitted at the bottom, and passing to the rear, and up into a jacket around the upper portion of the boilers, and then into the chimney. The object of the current of cold air is to prevent the destruction of the casing around the fire, and to keep the cold air from the boilers. There was no connection between the boilers by which steam or water could pass from one boiler to another; each boiler was supplied with water through a separate pipe. This arrangement has been in operation for two years, and the owner said he could make three times as much power with the same quantity of fuel as with his old style boilers. Abating something for zeal and confidence in one's own invention, I considered his machine a very economical one He told me he had no patent; if the world wanted it, let them have it.

In 1853, when the question of saving fuel in making steam was being experimented upon, the chief engineer of the Collins' Steamship Line, in a conversation with me, remarked, "If they increase the heating surface and power without a corresponding increase of water, they will blow their machines to the *devil*." He was a rough-spoken Englishman, about fifty, and had helped to build the first locomotive ever made in England."

[The tubular boiler in this section is deemed as safe, if not safer, than any other. The cause of its failure on the Western waters is, that the tubes fill with mud so solid that water cannot touch them; hence they burn, collapse, and play other inconvenient and uncomfortable tricks.—Eds.]

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Acceleration o Shot.

Messrs. Editors:—In your paper (Sept. 14th), Seth Boyden refers to a mode of starting shot from a fowling piece, by having a long, narrow chamber in the breech of the gun, and lighting the powder in this chamber at the top, next to the shot, and remarks that he thinks for an accelerating cannon this mode would be preferable to having the powder chambers along the bore of the gun.

I tried the long narrow chambers as accelerators for a cannon eleven years ago. The bore of the cannon was 2½ inches diameter; the two chambers of steel each 1½ inches diameter and 30 inches deep. They were a complete failure.

Suppose the bore of the gun is six inches in diameter and the narrow chamber 3 inches, it must be four feet deep to hold as much powder as would fill the bore of the gun one foot deep, which is less than the Whitworth gun uses safely. If we fire this charge at the top, it will burn down perhaps two feet, and ram the rest of the column into a cake as solid as any rocket is packed and into which the fire can not enter. It burns only on its end, and most of it after the shot has left the gun. It will be found that instead of burning six or eight times as much powder as a Whitworth gun of the same bore and giving six or eight times as much power, it has not given half so much power.

If to overcome the difficulty of the packing of the powder, he leaves a space filled with air only, at the breech, or makes his cartridge with a hole down its center, and puts a string of gun cotton through it, as I finally did, I think he will blow his long narrow steel chambers to flinders, as I did with the first shot I tried in that manner.

If Mr. B. will increase the length of the long, narrow chamber which he uses with his shot gun, from two to three inches, which is probably its present depth, till it will hold enough to fill the bore of the gun one foot, he will probably find his chamber several feet in length. He will certainly find that the narrower his chamber the less will be his penetration. Now if he tries a steel shot on a wrought-iron target, he may throw his shot through one quarter inch, possibly through three eighths of an inch, but never through one sixteenth as much iron as can be penetrated, or one eighth as much as has been penetrated by a shot from a barrel of half-inch bore with accelerators placed under it.

H. S. Whitfield also in the same number says he "has concluded that this thing of acceleration could be accomplished in another way much more simple and quite as effective by a cartridge with partitions, each partition containing a full charge of powder, and so divided that when fired from the front they will explode in succession." If this cartridge is made of the strongest metal, and so heavy that the valves wil not give way backward from the explosion of the first charge, it would require a cartridge ten or twelve feet long to hold sufficient powder to fill the bore of a six-inch cannon even four feet deep. The accelerator 18 feet long must then be increased to 28 or 30 feet long. But the valves would probably leak and all the charges be lighted at once and his gun blown to fragments. If it did not, this long, heavy cartridge would

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be so swedged in that it would not be removed the same day the gun was fired.

The objections most frequently urged against the accelerators under the bore of the cannon are; First, "They can not be cleaned." Ans.—It is found that even the small accelerators of the hunting rifles that had been fired five hundred or one thousand times during two or three years without being cleaned, on examination appear as clean as when they have been fired but five times, and as no shot ever slide along their surfaces, they do not need cleaning. Still even these accelerators under the bore of the cannon can and have been cleaned, dried, and oiled in a few minutes with a very simple apparatus.

Second objection—"The powder used in them is not in cartridges, and the exposure of such quantities of loose powder to the open air is dangerous." Ans.—The powder is in strong tin canisters, each containing the charge of, and numbered for, its particular accelerator, and so arranged that it is turned in without exposing a particle of it to the open air.

It would require no extra hands to load half a dozen accelerators for a large gun. The ordinary gun's crew required to move and aim it are sufficient. One of these men to each chamber charges it in half the time occupied by those engaged in loading the breech.

Several articles have appeared on the subject of a vacuum in the barrel for increasing the force; the last by Mr. Whitfield. In May, 1851, you filed a caveat for me in the Patent Office for a vacuum in front of the charge. I had tested it before, but the patent was not applied for till five years after, with the accelerator. The vacuum in front of the charge is the second claim. A. S. LYMAN.

No. 212 Second avenue, New York city.

The Inutility of Levees on the Mississippi.

MESSRS. EDITORS:—The subject of controlling or directing the waters of the Mississippi, which has been repeatedly treated in your journal is one of the gravest importance both on account of the interests involved and the immense sums of money and amount of labor expended on the levee system in the past, and because of the recommendations and attempts now being made to involve the Federal Goverement in the system, which, if successful will cause millions of dollars to flow from the treasury.

I have known the Mississippi for over thirty years, have lived on its banks, and now own lands washed annually and inundated by its overflows, and would greatly rejoice to see some effective system adopted by which its overflows and the caving of its banks could be prevented; but I unhesitatingly pronounce the levee system in the past, and however much improved upon in the future, inadequate to the task; that it is both radically wrong, and unphilosophical in principle; that, even if successful for a series of years, in the course of time it would become the greatest and most alarming curse; for notwithstanding it is a law of all flowing waters to cut out a channel deep and broad enough to contain their volume of waters (which law, in a state of nature, that is, before its water-shed is denuded of its flora, is more certain and less subject to be broken in upon by heavy rains and snows than in a contrary condition), yet these channels are liable to be filled or choked up by the sand, gravel, and dirt brought down by the streams. This filling or choking up and consequent overflows and changes of beds, is less when their water-sheds are covered with their natural flora than when denuded by man or otherwise, because the detrition of the earth's surface is in a great measure prevented by the shade, stems, boughs leaves, and roots, standing or fallen, of the flora of the water-shed drained by the stream; but when the water-shed of the stream is cleared of its natural flora, and subjected to cultivation, especially to our superficial cultivation of 6 or 8 inches, greater quantities of sand, gravel, and dirt are detached from their sites, swelling the volume of the stream, and increasing the quantity of deposition of these materials upon the bottom of the channel; for as they are specifically heavier than the water they are constantly seeking a lodgment and rest; and as in all large and deep streams like the Mississippi River, the current near the bed is more sluggish (owing, I suppose, to the greater friction and possibly of the superincumbent weight of waters, etc.), than the surface current, this deposition upon its bed takes place, gradually filling it up, and causing it periodically to overflow its banks. Now I have before said that, even if the levee system could be made successful for a series of years (and it could only with the greatest outlay of money be made so for a few years at a time), it would in the course of time become the greatest and most alarming curse. Now why do I say so? Because if my views be correct, and if I am not misinformed, the levee system in Europe and elsewhere demonstrates the fact that the dirt must be piled up and the levees raised higher and higher every year, with the raising of the bed of the river, until in the course of time the levees will become several hundred feet higher than the original banks of the river, and the bed of the stream also higher than the banks; the levee, liable at any moment to give way, and the mad waters carrying havoc and destruction in their course. Who can estimate the destruction of life and property in such a catastrophe? Even under the system as it existed before the war the thoughtful citizens living behind the levees as they then existed, rarely exceeding twenty feet in hight, during the time of high water lived in constant dread of such a catastrophe, and such did often then occur. But who can estimate the cost and labor required to build and keep up such a system for a hundred years or so?

But is there no remedy for this great evil of annual overflows? I answer that I know of none, but I think it may be greatly mitigated, and perhaps eventually prevented, by opening all outlets to the ocean and to the interior; widening and deepening their channels, and intersecting the whole valley with wide and deep canals, instead of railroads whenever and wherever needed for commerce, etc.; diffusion and shorter passages to the ocean, and deep cultivation, say to the depth of two or three feet, which is to my mind the only lasting and philosophical remedy; thus, when the whole water-shed drained by the Mississippi River and its tributaries is cleared and brought into a high state of cultivation, absorption, use, and evaporation will consume the excess of waters, and the now uncontrollable force of the Mississippi River will be measurably if not entirely brought under man's control. Until then we had better endure the ills we cannot avert than increase the evil and be met with constant and inevitable failures. THOS. Y. BERRY.

Port Gibson, Miss.

[We hardly agree with our correspondent in his deprecation of the government devoting its money and energies to the great improvement mentioned. It is as much a subject of national importance as many other projects which have received the aid and been taken under the control of the National Government. But his suggestions relative to canals which might be available for purposes of irrigation and intercommunication, seem to be worthy attention.—EDS.

The Compensation Balance.

MESSRS. EDITORS:—I am prepared to make the following favorable statement concerning the compensation balance, as a principle. I have found that since I could remove the variation consequent upon variable resistances to the balance of a watch, that the compensation balance has fewer of those eccentricities so generally attributed to this principle by the best chronometer makers. The effect of variable temperature on the very best oil, seems to have a large share in the trouble. I say this in justice to the principle in question. The compensation balance may be defective from one band being thinner than the other, and have more action; but the material does not necessarily lose its elasticity. The smaller the scale consistent with perfection in the bands, the harder and tougher (the best word I have) is the material, in effect (I say, in effect, because the forces which are perpetually at work reduce with the scale of construction); I never could make a good compensation balance on the usual marine chronometer scale and always blamed myself for the failure.

J. MUMA.

Hanover, Pa.

P. S.—My challenge—page 147, current volume—has not yet been taken, as I told you it would not be. I have not received one letter concerning it. The world has been humbugged with the watch long enough. I make no allusion to low-priced watches; they are, as a general thing, a prodigy of production for the price. J. M.

Fish Culture--A Good Suggestion.

MESSRS. EDITORS:—On page 114 of No. 8, Vol. XVII of the SCIENTIFIC AMERICAN, I find a very interesting article on fish culture, and it seems to me an important subject. I have closely observed the habits of many of the fishes that inhabit our Southern streams, and among others the trout. Here they are migratory, or at least they leave the small streams in October, and return to them in March. They spawn in April, and the young brood are hatched out in a few days. Now my object in writing this is to suggest that the eggs of the trout and other fishes might be protected in their natural bed where deposited by the mother, by placing over it a frame of fine wire net or cloth. But little attention is needed to find the nest of the trout or other fish; then as soon as the eggs are all deposited you have only to put the wire net over the nest and it will keep off nearly all of the fish and insects that prey on the eggs. In this way I think you may be sure of 75 per cent of the eggs producing young trout, and as these remain near the nest till old enough to escape from most of the dangers of their infant state, the wire net will save nearly all of them. A. C. STEEDE.

Americus, Miss., Sept., 1867.

Nitro Glycerin.

MESSRS. EDITORS:—In your issue of the 7th Sept., you insert on page 153 an article, not very friendly to this new agency in the useful arts. The sad accidents that occurred at San Francisco, Aspinwall, Sidney and the Wyoming hotel will never cease to be lamented by any one having the least concern for humanity. Similar calamities are not likely to occur again.

Nitro glycerin is less dangerous than gun powder, and no more intelligence is required to employ the former for blasting purposes, than the latter. Upwards of ten thousand blasts have been made under my directions, and I have handled thousands of pounds, and there never has been on my works a life lost. At Oswego, between five and six thousands of blasts have been made and no accident. Besides these, many gentlemen in different parts of the country have been using large quantities for blasting and no accidents have transpired. We hear of the explosions of gun powder mills, of the killing of people by premature explosions and however sad the destruction may be, it creates no especial wonder!

Practically there has been found considerable difficulty to explode nitro glycerin. An ordinary fuse that will ignite gun powder, will not explode nitro glycerin. I have discharged tin cartridges loaded with 2 ozs. of powder in a pint of nitro glycerin and failed to explode it. This and similar experiments I have made many times. I have ignited a pint of it and seen it burn with a red blaze until the whole was consumed, and no explosion. I have carried it in a wagon, on several occasions, over rough roads and at a speed of four miles per hour, and I am still alive.

For blasting purposes nitro glycerin has excelled all other explosive substances. At the Hoosac tunnel, on the Baltimore and Ohio Railroad, at Oswego and many other places it has proved to surpass gun powder for disrupting rock. It is being rapidly appreciated throughout the country and many thousands of pounds are required to supply the demand. In the copper, iron and other mineral regions the demand is greater than the facilities to supply. It fragmentizes rock, rends assunder cast and wrought iron, and upheaves the sunken wrecks and strong barriers in harbors.

The gases of nitro glycerin are sufficient to give an explosive force of 169,000 lbs. per cubic inch, and the whole of this is effective as the detonation is sufficiently rapid to produce a complete explosion. Not so with gun powder. Its explosive force is about 13,000 lbs. per cubic inch, but of this only 32 parts out of 100 explode, the remainder, 68 parts, burns or is wasted.

All explosive substances are more or less dangerous. Gun powder, gun cotton, nitrated sawdust, gambia, bark, pulp, etc., are all to be handled with care. When these are compounded with chlorate of potassa the hazard becomes vastly increased

You have styled nitro glycerin a "demon," which means the devil. If you are correct I have had a curious associate, nevertheless I admire his or its potency. The Christian is cursed by the Mahomedan. The Jews, who despised the Christians for centuries, are not even now permitted to shelter in Christian Moscow. As the light of intelligence dispels the darkness of ignorance, prejudice passes away. Truth will prevail and science will command admiration!

T. P. SHAFFNER.

New York, Sept. 1867.

The Light of Comets.

MESSRS. EDITORS.—In some recent communications for your columns from Prof. Ramsey, and Prof. Wilhelm, concerning the tails of comets I have been much interested. But in the discussion the question has arisen to my mind "how are we able to see these tails, admitting the theory of either of the gentlemen to be correct?" *i. e.* whether they be composed of reflected light as supposed by the one, or of refracted light as by the other, in either case it is light only that forms the tail so far as their explanations indicate. Now it is certain that in vacuity light is never originated or detected; that mere space can neither become luminous nor be illuminated. Light, either as a cause or an effect must be connected with matter. The light then whether reflected from, or refracted by the nuclues of the comet must fall upon some material substance that it may become visible to us. What is this substance which must be there in order to reflect to us the solar rays? Dr. R. would perhaps think to solve the problem by saying that this light is not simple but "electrified" by impringement and reflection from the opaque nucleus. Electricity however cannot pass through a vacuum; does he say that these two forces which singly are unable to traverse a void are yet able to make the trip in company? *Credat Judaeus non ego!*" I believe that the most interesting point in this investigation will prove to be the establishment of the existence of the heretofore hypothetical interstellar medium, the "all-pervading ether" of the physicists which is a *sine qua non* of the undulation theory of transmission, and which is doubtless the "resisting medium" by which Encke accounted for the secular acceleration of his comet. This medium, illuminated gives to our vision that most remarkable of heavenly phenomena the comet's tail. H. S. FULLERTON, M. D.

How far a Suction Pump can Lift Water. The Egyptian Lotus.

MESSRS. EDITORS.—In answer to your correspondent, A. T., of Kansas, page 167, current volume, who proposes to raise water 31 feet by setting his pump "eight feet below the surface of the ground which gives it *twenty-three feet to suck the water* and eight feet to lift it to the heater," you say, "The plan will not work." Surely this is an error. A pump in such a situation even if 1,800 feet above the ocean level will suck water considerably more than twenty-three feet, while it will lift it any distance according to the strength of the pipe and the power applied.

I notice, also a slight error in what is said of the "Egyptian Lotus on page 166 of the same paper. The flower referred to is of the same family (*Nelumbium*) with the Egyptian lotus, but of a different species and though a very magnificent plant is by no means so uncommon as would be inferred from your article. It is found in the Southern and Western states where it is known as the Water Chinquepin and in the Delaware below Philadelphia. How it got into the Connecticut is a mystery. Mr. Gray suggests that it was introduced by the Indians. The roots and seeds are both said to be nutritious.

The roots can be easily obtained at low water and said to grow readily when transplanted. A large number have been taken up this year by various gentlemen with the hope of introducing it into new localities. WM. EDWARDS.

Middletown, Sept., 1867.

[We are still quite content with our answer to A. T., of Kansas, and find in it no error. Will Mr. Edwards please read it again and observe that he does not fairly represent it in his criticism,—EDS.

FLEXIBLE SANDSTONE.—Dr. C. M. Wetherell, of Philadelphia, has recently investigated this singular mineral substance known as Itacolumite, so called from Itacolumi, a mountain of Brazil. It is of particular interest from its almost universal occurrence in gold regions where diamonds are found. Its peculiar flexibility, whereby without breaking, sheets of it can be bent back and forth through a considerable curve, this gentleman has found to be due to small and innumerable ball and socket joints existing through the mass of the stone, each joint permitting a slight degree of motion.

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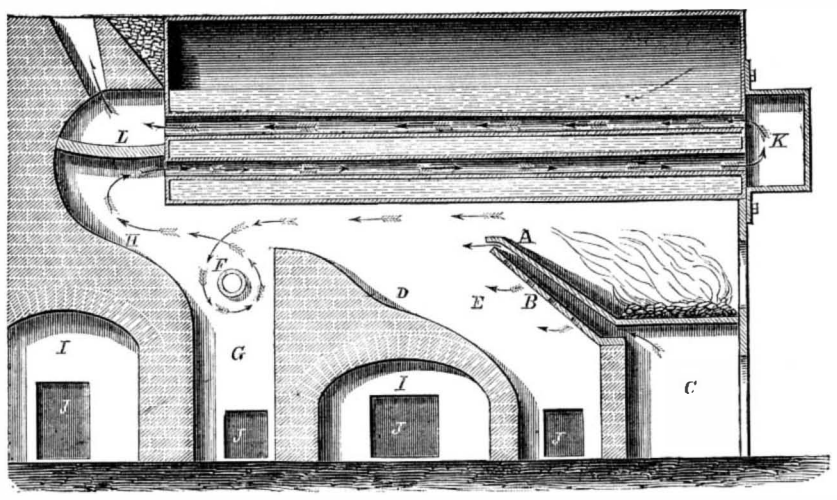
Another Mode of Setting Boilers.

Messrs. Editors:—In your issue No. 9, Vol. XVII., front page, is an article, with an illustration, from Mr. F.W. Bacon, for the setting of steam boilers, which contains many excellent suggestions. Having given this subject much study, I here present a diagram of the result thereof, merely stating that it had been my intention to apply for a patent therefor, but now, if it is worthy of any merit, it is freely given to the public for the general benefit.

The main features of this invention consist: 1st, In a metallic fire wall, A, luted or covered with fire-clay cement, and set at an angle of 45°. 2d, A perforated plate, B, running nearly parallel with the former, leaving an air space between the two about two inches at the upper edge, and three inches at the lower. This air space to be the full area—both longitudinal and cross section—of the fire wall, A, and to communicate with the heated air in the ash pit, C. 3d, The fire wall, D, of the gas chamber, E, extends to three-fourths the length of the boiler, with a waved incline to admit of the natural circular sweep of the incoming gas, the precipitation of ashes, dust, etc., the easy outgo of the flames, and the direct radiation of the heat to the surface of the boiler. 4th, An air pipe, F, in the gas space, G, regulated by a damper, to allow of a full admixture of air, and consequent combustion of any gas that may have escaped the chamber, E. 5th, The rounded sweep for the flames by arch, H, and the continued widening of all the flue spaces from first arch at A, to final entrance to chimney proper, which should also be of greater area than the combined flues. 6th, The drying oven, I I, for timber and fuel. J J represent the doors of the ash pits and the drying kilns, K the connecting bonnet between the flues at their return end, and L the division or partition between the flues.



CHAPMAN'S SYSTEM OF BOILER SETTING.

The action is thus:—The flames, passing over the metallic fire wall, heat it red hot, which heats up the air passing in the air space, E. This heated air, passing through the perforations of plate, B, mixes with the gases eliminated by the fire, and without reducing their temperature, causes them to ignite with rapidity, while the peculiar form of the bed of the gas chamber allows them to mix freely and have an easy egress. The old-fashioned, square walled chambers and fire back cannot help impeding, fearfully, the beneficial working of any boiler fire; a side look into any furnace thus constructed will show the great loss thereby occasioned, and the wonder is that any draft at all is obtained. The incline in the fire walls and those of the gas chamber are natural deductions, and work as well in practice as they appear in theory. The air pipe, F, supplies any deficiency of air necessary to consume all the remaining gases at the entrance to the boiler flues, and is easily regulated by a damper. The flue spaces, also, are steadily enlarged as the length increases, so as to insure a powerful draft and perfect combustion. Advantage is taken of the peculiar gas chamber bridges to build ovens for the convenience of drying fuel, as in saw mills, or for other purposes.

Thus it will be seen that the flames have a continuous, unchecked roll and sweep, that the gases are mixed with an air as hot as themselves, igniting and mixing easily, and that all the reflecting facets have their right angles to the boiler, no heat or hot gases are lost, and the dust and ashes are well under control. The plan presented represents a three-flue boiler, but it applies to any other.

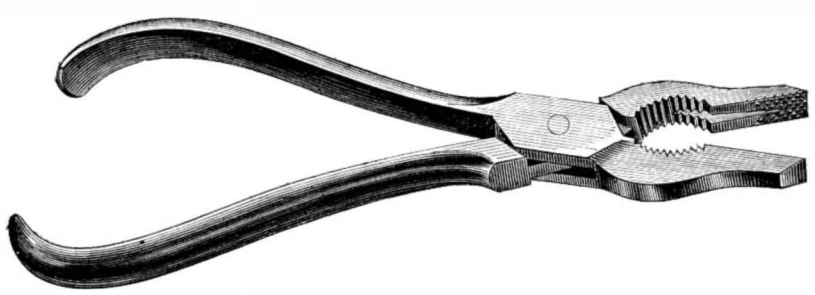
Penrose Chapman.

Brunswick, Me.

The inclined and perforated bridge wall and back appears to be a very desirable improvement. The sweep of the after walls is also a good idea, but it seems to us that the air-pipe, F, is introduced too far from the fire to insure heat enough to properly consume the carbonized gases.—[Eds.

Improvement in Hand Pliers.

The engraving presents a perspective view of a pair of improved pliers, patented in the United States January 8, 1867, and for which patents are now pending in Europe. The only change from the ordinary pliers is the form and adaptability of the jaws. It will be seen that the end portion of the jaws are adapted to all the uses for which the ordinary flat pliers are intended. The bent portion of the jaws are toothed, as seen, and are intended for turning gas burners, holding round rods or bolts while removing rusty nuts, for the use of druggists for compressing corks, and also as an ordinary nut cracker. The tapering groove in the straight part of the jaws is intended for holding wire, rivets, or screws for fitting by the file, thus serving the purpose of a hand vise. No more particular reference to parts is necessary, as the illustration is plain enough for any one to understand. The improvements appear to be capable of being turned to good account and we think they are really valuable.



WALKER'S COMBINATION PLIERS.

The patentee, Sylvanus Walker, may be addressed at 59 East Chester Park, Boston, Mass. He is willing to sell the whole right for the United States or to make arrangements for the manufacture of the pliers on a royalty.

TRIALS OF BREECH-LOADING RIFLES. COMPETITION, 1867.

We had hoped before this to have placed before our readers engravings and detail particulars of the nine rifles which have been selected for future trial from the 112 sent in to Woolwich for competition. Circumstances, however, beyond our control have delayed the matter, so we purpose now to give a general description of these selected arms, hoping in a short time to furnish full details. In order to avoid any appearance of invidious distinction, we will take the names of the competitors in alphabetical order. The weapons, then, are—the Albini and Braendlin, the Burton (two systems), the Fosbery, the Henry, the Joslyn, the Martini, the Peabody, and the Remington rifles. The Albini and Braendlin rifle is a small bore, ·462 of an inch caliber, having the breech-block hinged on to the rear end of the barrel. It is opened by a small knob on the right hand side of the block, which, when open, rests on the barrel. The cartridge is inserted in the breech-chamber, and the breech-block returned, by which the chamber is closed. As the hammer descends, it acts upon a bolt which secures the breech-block, and at the same time transmits a blow to a piston enclosed in the breech-block, and by which the cartridge—central-fire—is ignited. On opening the breech again an extractor, working on each side of the barrel, removes the cartridge case. We believe that the Albini system, firing the Boxer cartridge, has been adopted in the conversion of the rifles of the Belgian army. The first of Mr. Burton's two systems is a central-fire, large bore, ·577 of an inch diameter. The breech-block is hinged under the barrel, and is opened downwards and towards the muzzle by a small lever in front of the trigger guard, which it somewhat resembles. The piston is carried in the breech-block, and its return after firing is effected by the lowering of the block, which also extracts the cartridge shell. Mr. Burton's second system is of the same caliber, but on the plunger principle, after the fashion of the Prussian needle-gun, which in outward appearance it somewhat resembles. The great distinction between the two, however, is that the needle-gun, as our readers are aware, consumes its own cartridge case, whilst the Burton gun is adapted for the Boxer cartridge. The plunger is locked by a small boss formed on its upper side, and which takes into a slot in the shoe on the plunger being pushed forward by a knob similar to that on the Prussian gun. The front end of the plunger carries an extractor by which the cartridge case is withdrawn after firing.

The Fosbery rifle has a ·568-inch bore, and a breech-block hinged and opening over the barrel in the same way as the Albini rifle. The breech-block is opened by the sliding motion of a knob, fixed on the right side of the arm just below the breech-block. This knob acts on a curved lever and on a wedge-piece, the arrangement allowing the breech to be rapidly opened and closed, the extractor being worked from the same action. The Boxer service cartridge is used, and is exploded by a piston passing through the breech-block, the block being locked by a bolt acted on by the tumbler. The fifth system is that of Mr. Henry, and is a small-bore rifle, 455-inch caliber, using the Boxer cartridge. Here the breech-block has a vertical sliding motion, which is obtained from a lever fitting closely under the trigger guard. The piston takes a diagonal direction through the breech-block, which is provided with an extractor. The next arm for notice is the Joslyn rifle, which has a very neat and simple breech arrangement, and is adapted for the rim-fire copper cartridge, although it may be used for either rim or central-fire. The breech-block—or, rather, breech-cap—is hinged on the left side of the barrel, and is opened by a small knob acting on a spring catch on the right side, which has to be withdrawn and not pressed inwards, so that opening from accidental pressure is impossible. The rear end of the barrel is encircled by a raised metal rib or projectiou, fitting into a corresponding recess in the breech-piece. This secures the block against any back action in firing, whilst it is locked by the spring catch already noticed. For further security the nose of the hammer fits into a cupped recess on the rear of the breech-block, and into which the head of the plunger protrudes. Thus, were the hinge and catch to be removed—as, in fact, they have been in some private trials—the breech-block would be securely held in position during the discharge of the piece. The extractor is worked by a wedge cam attached to the hinge and joint of the breech-cap, and by which the cartridge case is ejected with ease and certainty.

The Martini rifle next demands our attention. It is a small-bore arm, of ·433-inch caliber, and in which the ordinary lock is replaced by a spiral spring and piston, no hammer being visible. The rear of the breech-block is hinged to the breech-frame, and the depressing of a lever behind the trigger guard opens the chamber for the insertion of the cartridge. As the breech is opened, the empty cartridge case is extracted, and the piece cocked. This arm is adapted for the copper rim-fire cartridge. Our readers may probably remember the next arm, the Peabody rifle, which we described last year. This rifle has a bore of ·5-inch, and is of somewhat similar construction to the Martini rifle. It, however, has a lock and hammer, but otherwise is designed for the copper-cased rim fire cartridge. The rear of the breech-block is hinged to the frame whilst the fore part is depressed by the action of the trigger guard, which forms a lever, as in the well-known Spencer repeating rifle. The top of the breech-block is grooved and acts as a guide for the cartridge, whilst it allows of a very small depression only of the block. The cartridge case is quickly extracted by a lever acted upon by the breech-block. The Remington rifle is of the same caliber as the Peabody, and is fired with the Boxer small-bore cartridge. The breech end of the barrel is closed by a stop, which works on a pivot centered below the barrel. The breach end of the barrel is strengthened by a metal hoop or band, against the rear edge of which the stop takes its bearing. The stop is held in position by the action of the lock, and the objection which we once raised to this arm—that the locking arrangement was not thoroughly reliable—appears to be removed in the present example. It would be manifestly unfair and illiberal on our part to enter upon a discussion of the comparative merits of these weapons without having had an opportunity of practically testing them, or, at any rate, of manipulating them. Some we have tried, whilst others we have not handled, which would render discussion on our part still more unfair. We trust, however, that we shall shortly be able to place the matter fully before our readers with all its interesting details. Before concluding, however, we may give the results of the firing at the official trials in the following tabulated form, and we now place the weapons in order of merit for rapidity, to which arrangement they are fairly entitled:—

Joslyn	12	shots in	47	seconds.
Martini	12	"	48	"
Fosbery	12	"	50	"
Remington	12	"	50	"
Burton No. 1	12	"	57	"
Henry	12	"	57	"
Albini and Braendlin	12	"	61	"
Burton No. 2	12	"	62	"
Peabody	12	"	63	"

It will thus be seen that the Joslyn rifle heads the list, while the Peabody is last, and then the 12 shots include three miss-fires. Fosbery and Remington are ties, as also are Burton (No. 1) and Henry. In justice to some of these arms we must say we have seen quicker practice with several of them in private grounds, and apart from the disturbing influences of an important public competition. The Joslyn rifle, for instance, only attained a rapidity of fifteen rounds or so per minute, which we know to have been far exceeded on other occasions. And the same of one or two other weapons. The Joslyn rifle gave some very good results at the late Wimbledon meeting, and is a recognized military arm in the United States. The Remington rifle has been largely tried in America, France, and Austria. The present position of the competition is this: The nine selected competitive systems are now awaiting the further and exhaustive trial which may be expected to take place about four months hence. To this end each of the accepted competitors has to furnish six rifles and 6,000 rounds of ammunition. When this has been consumed, we shall, no doubt, know what will be the English small-arm of the future.—*London Mechanics' Magazine.*

Single-Cylinder Marine Engines.

The American engineers have generally insisted that their single-cylinder marine engines seldom or never stop on the center. But we see in the *Scientific American* an illustration and description of a hydraulic jack for getting the cranks off their centers. It is patented by the superintending engineer of the Pacific Mail Steamship Company, Mr. W. H. Vanderbilt, a near relative, we believe, of the well-known "Commodore" Vanderbilt, one of the very largest owners of steam shipping property in America. We conclude, therefore, that Mr. Vanderbilt *has* had his single engines sticking on their centers.—*Engineering.*

[The main reason why our single-cylinder engines do not stop on the center is that the engineer is so skillful and the engine valves are so completely under his control that the drag of the wheels can rarely affect the engines in carrying the crank too far. The invention alluded to is intended only for infrequent contingencies.—Eds.]

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A. S. LYMAN'S PATENT ACCELERATING RIFLE.

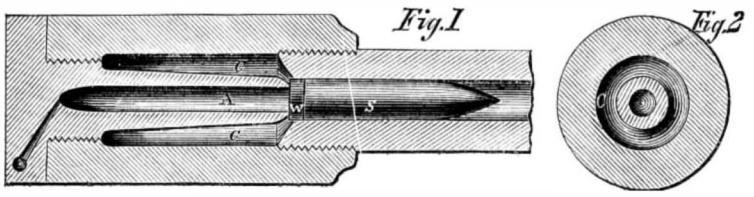
Fig. 1 is a longitudinal section of the breech of an accelerating hunting or target rifle.

Fig. 2 is a cross section through the accelerator.

A is the initial charge chamber; C C is the accelerating chamber; S is the shot.

This rifle is loaded at the muzzle when standing nearly vertical. The powder first fills the center tube, A, which holds twenty grains, then runs over into the accelerating chamber, C C, which surrounds it, and is upward of ten times as large as the center or initial charge chamber. A wad, W, of leather (made by cutting a piece from sole or harness leather with a punch) is next pushed down upon the end of the initial charge chamber. This cuts off all connection between it and the accelerating chamber. The barrel may then be wiped out if desirable, and the shot sent home.

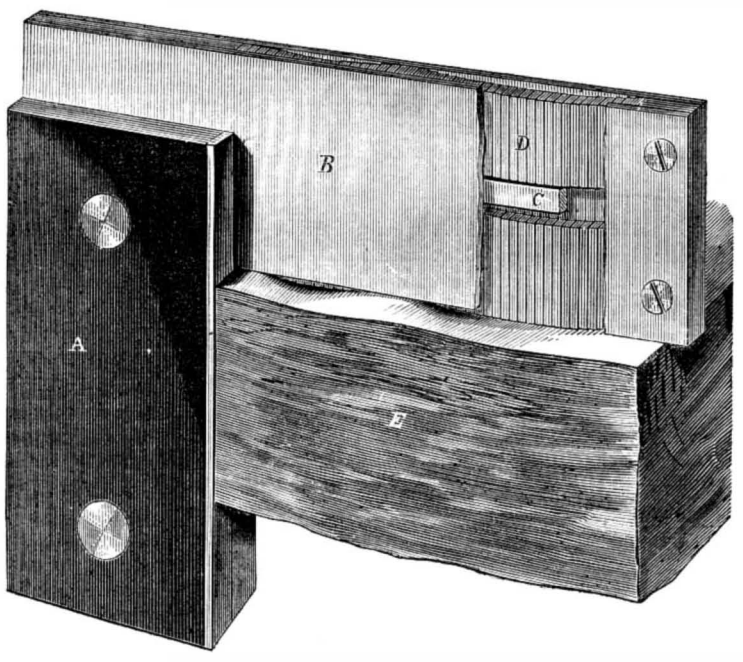
The range of this little rifle but $\frac{5}{8}$ inch diameter of bore, and weighing, with its telescope, less than 15 pounds, using half an ounce of powder and one ounce shot $2\frac{1}{4}$ inches or six calibers long, is 1,000 yards with 1° 28′ elevation, and 1,300 yards with 1° 58′ elevation. It will be seen that this is a greater range than is obtained by any known cannon at the same elevation except the Accelerator, and more than twice as great as that of the Whitworth or any other rifle known of the same caliber.



This great range and horizontality gives it a vast advantage for hunting and other purposes where the exact distance is not known, as explained in description of Accelerating Cannon in SCIENTIFIC AMERICAN of Aug. 3d.

Improvement in Try-Squares.

In the use of the ordinary try-square for trueing up stock it is necessary either to stoop repeatedly in order to look under the blade of the square, or to raise the piece being operated upon to permit the light to show between the blade's edge and the work. Of course, this, if long continued, is a wearisome labor, especially if the piece being trued is heavy or bulky. The object of the improvement in the square shown in the engraving is to obviate this necessity by permitting the eye to note the progress of the work by a glance at the top of the blade. How this is effected may be seen by the following description:—A is the handle or stock of the try-square and B, the blade. This latter is hollow or double, composed of two longitudinal blades secured, as seen, a little distance apart. Running lengthwise through the center of the space between these blades is a square bar, C, on which hang cross pieces, D, with a mortise in each sufficiently long to permit a slight vertical movement on the central bar. These drops are about one-sixteenth of an inch in width, made of steel, and fitting nicely one to another. The central bar permits these uprights to drop below the level of the lower edge of the blade but only flush with the top edge. Thus it will be seen that when the piece which is being planed becomes true, all those uprights which bear on its surface will be exactly level with the top edge of the blade. The block of wood, E, is purposely shown to be very uneven to exhibit the working of the square, a portion of one side of the blade and a part of the central bar being broken away to expose the parts.



BURGUM'S IMPROVED TRY-SQUARES.

This invention was made at the suggestion of a correspondent in the SCIENTIFIC AMERICAN a few weeks ago and it appears to meet a want long experienced. For further particulars address John Burgum, Concord, N. H. Patent pending through this office.

A QUARTETTE OF MATHEMATICAL GYMNASTS.

The errors which have lately been made in calculating the power of projectiles, the resistance of armor plates, and the force of steam vessels when used as rams, seem to indicate that a knowledge of first principles is more necessary for a correct appreciation of mechanical problems than any amount of abstract mathematical skill.

The scientific gentlemen whose errors on the subjects alluded to, it is intended at this time to point out, are Captain Noble; Professor Daniel Treadwell, late of Harvard University; one of the Shoeyburyness scientific reporters, and Rear Admiral Louis M. Goldsborough, of the U. S. Navy.

The curious blunder of Captain Noble, of her Britannic Majesty's Service, the famous artillery calculator, in computing the dynamic force of the fifteen-inch shot, has a parallel, in point of inaccuracy, in a late error (which will presently be referred to) of another Shoeburyness mathematician in calculating the resistance of a certain iron-clad target, and also in the blunders committed by Professor Treadwell in his calculation on the fifteen-inch gun. Captain Noble, it will be remembered, made the following error in his calculation of the power of the fifteen-inch shot. Referring to page 30 of his report, the result of his calculations is stated as follows, viz.: That with a "50-pound charge and a 484-pound shot an initial velocity of 1,070 feet per second will be the result." This is equivalent to a force represented by 8,658,760 pounds raised one foot high, which divided by 50 gives only 173,175 foot-pounds as the energy exerted by each pound of powder.

On June 27, 1867, Captain Noble fired the fifteen-inch gun at Shoeburyness with the following result: Charge 50 pounds, weight of shot 450 pounds, velocity 1,214 feet per second, dynamic force of the shot 10,328,400 foot-pounds, or divided by 50 gives 206,570 foot-pounds for each pound of powder. Thus Captain Noble was no less than 1,569,634 foot-pounds out of the way, and he himself practically demonstrated the fallacy of his calculations, together with his want of knowledge of the weapon he had condemned on the results of blundering computation. And more unfortunate still for the reputation of this officer, he asserted that 50 pounds "is as heavy a charge as it will stand." Now these guns have been fired frequently, some of them for 100 rounds, with 100-pound charges of mammoth powder=83 pounds of such powder as Noble's calculations are based upon. Consequently the energy produced represented by 83×206,570 (the force of one pound)= 17,145,310 foot-pounds, or about double the power this ordnance officer asserted it was possible for the fifteen-inch gun to exert!

We are sorry to say that Professor Treadwell has blundered still more than Captain Noble in his speculations on the capacity of the fifteen-inch American gun. In Vol. VII. of the Proceedings of the American Academy of Arts and Sciences, we find the following statement in a communication from Professor Treadwell, read by Professor Winlock, viz., that the fifteen-inch gun with a projectile of "315 pounds" weight and a charge of "50 pounds" of powder an "initial velocity of 1,118 feet per second" is obtained, which is equal to a "force in pounds raised one foot high, 6,057,950."

Referring to the results of trials before alluded to, it will be remembered that 50 pounds of powder projected a 450-pound shot with no less a velocity than 1,214 feet per second, which is equal to 10,328,400 foot-pounds, or 4,276,450 more foot-pounds, or nearly double the *vis viva* stated by the Professor. And in order to show still further to what extent he has underrated the real power of the gun, it is only necessary to repeat that with a proper charge the gun imparts an energy to its shot of no less than 17,145,310 foot-pounds, as tested by more than a hundred discharges from one single gun, as before stated.

In the same communication we find the following put down as the performance of the Armstrong wrought-iron coil gun: "Weight of shot 600 pounds," "charge of powder 100 pounds," "initial velocity 1,400 feet," "force" of shot "in pounds raised one foot high, 18,375,000." According to these statements a pound of powder in the 15-inch only exerts a force of 123,039 foot-pounds, while the late Shoeburyness trials show that this piece actually exerts a force of 206,567 foot-pounds; thus the Professor underrates the American gun to the enormous extent of 83,537 foot-pounds for each pound of powder employed, a degree of blundering quite inexcusable in one who undertakes to teach the American Academy of Arts and Sciences. The enormous friction of the rifle shot and the absence of friction in the 15-inch shot, should have suggested to the Professor that his calculations must be erroneous.

Again, the 100 pounds which he puts as the charge in the Armstrong gun has only been used on one or two occasions; 70 pounds was called the service charge, and even that ruined the gun in a very short time, and the last one tested burst at the sixth fire with but 70 pounds. In a word, the English themselves admit this gun to be a dead failure. But with this charge, *i. e.* 70 pounds, and a 511-pound projectile, an initial velocity of only 1,250 is obtained; hence the force of the shot is equal to 12,500,000 foot-pounds, or only 178,528 foot-pounds against nearly 207,000 for the 15-inch.

While Professor Treadwell has overstated the power of the abortive 13·2-inch English wrought-iron coil gun, he has as we have shown understated the power of the American 15-inch cast-iron gun in the ratio of 6,051,950 foot-pounds to 17,145,310 foot-pounds, that is, he has underestimated its capacity *nearly three-fold!*

In looking through Professor Treadwell's paper, an explanation which seems to account for these astounding blunders may be found in the fact that the document in question is intended as an argument in favor of the coil system of constructing cannon, his patent system. On this point it will be enough to say that the Armstrong coil system, which the Professor crowns with unearned laurels, is utterly unable to meet the strains put on heavy ordnance; in short, it is a complete failure, and is so acknowledged in England by the fact of its abandonment for a simpler system. The Armstrong system is now admitted to be founded on erroneous mechanical principles.

Much more remains to be said on this point, but we pass on to the next candidate, the Shoeyburyness scientific reporter. And with respect to the blunder made by this official in his calculations on the resisting power of an iron target, we cannot do better than quote from the London *Army and Navy Gazette* of August 24th. The *Gazette*, after giving its views of the self-satisfied air of the Shoeyburyness ordnance and select committee men, says: "There is, we see by the pages of the leading journal, a recent and rather remarkable illustration of the utter fallaciousness of the calculations at Shoeburyness, which the scientific officers would have done better to have kept to themselves. It was considered desirable to test the power of the American system of laminated plates as compared with that of solid plates. One target was composed of a solid 7-inch plate, one of two $3\frac{1}{2}$-inch plates, and one of three $2\frac{1}{3}$-inch plates, bolted together."

We are told that "the ratios of resistance under the 'empirical rule' ought to have been 49, 24, and 16 respectively. The result was ludicrously at variance with the empirical rule, and is represented in the proportion of 61, 57, and 52 respectively." It is not likely that any comments can add to the force of the teachings of such a result.

The blunder to which we now call attention, in point of ignorance of principles, is entitled to cap the monument of blunders whose base and shaft is formed by the others which we have already mentioned. It is the extraordinary hallucination of no less a mathematician than Admiral Goldsborough with regard to the smashing or punching power of rams. The Admiral's fallacious reasoning deserves to be pointed out at the present time, from the fact that he still clings to an error which, if he has any conception of the subject, he must have seen long since.

In his report to the Secretary of the Navy in 1864, the Admiral strongly advocates the employment of rams for the protection of harbors, unprovided with guns, which he says "are detrimental to unity of purpose." This view he attempts to sustain by the absurd statement that a ram weighing 10,080,000 pounds, moving at the rate of 15 knots an hour or 25 feet per second, "is equal in point of shock" to a ball of iron weighing 252,000 pounds striking with a velocity of 1,000 feet per second. This ball is 10 feet $2\frac{3}{4}$ inches in diameter. The striking force of the ram is measured by its equivalent of a little over 100,000,000 of foot-pounds, while the striking force of the 10 feet $2\frac{3}{4}$ inches ball is measured by no less than 3,906,000,000 foot-pounds. In other words, the Admiral, by not understanding the fact that the comparative "shocks" of the impact of moving masses are measured, not directly as their velocities, but as the squares of their velocities, has committed the ludicrous blunder of exaggerating the power of his ram nearly forty fold.

The Admiral's ramming theories appear to have been conceived while he was in command of the naval force in Hampton Roads opposed to the *Merrimac*, and while that iron-clad was nightly haunting his dreams. The official delivery of these theories was formally announced with the ceremony due to a royal birth, in the report to the Secretary referred to.

We have a few other mathematical acrobats on our list, but as their summersaults were turned on another stage, we will not mention them at the present time, but we hope before long to place them before the readers of the SCIENTIFIC AMERICAN. We will briefly observe, however, that one of them is not a thousand miles from the Navy Department, and he is still, we believe, accumulating figures with extraordinary cunning and industry.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The meetings of this Society were resumed, after the summer intermission, on Thursday evening, Sept. 19th. The attendance was small, and the exercises were of a somewhat miscellaneous character, being chiefly confined to discussions and comments upon a budget of scientific items collected by the Chairman, Prof. Tillman, during the summer months.

FACTS CONCERNING DEAFNESS.

Following the reading of a note upon the causes of deaf-dumbness Dr. Richardson remarked upon some prevalent but false notions, respecting the use of aids to hearing and to sight. Persons having but a slight impairment of their auditory apparatus, are loth to have recourse to speaking trumpets fearing that thereby permanent deafness will ensue. But this is a mistaken idea, for the use of this aid is in effect a kind of invigorator, bringing the organs of hearing into full play, and thereby developing rather than paralyzing them.

In supporting similar views in relation to the organs of hearing and sight, Dr. Richardson recounted the observations made by Dr. H. R. Smith, of Chicago, during a recent visit of scientific research to the Mammoth Cave. The fish of these subterranean lakes are not only without eyes or even traces of an orbit, but so far as he could ascertain by careful and

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indefatigable investigation, are destitute of the sense of hearing; these facts going to prove the truth that the functions of the auditory and optic nerves become impaired by the partial or total deprivation of their natural stimuli, sound and light.

But on the other hand, excessive use of these nerves tends to their paralyzation. The case of three boiler makers of this city made permanently deaf by hearing incessant hammering, was mentioned; also many cases of loss of hearing by artillerymen. In this connection it was incidentally mentioned, that the noise made by brass cannon affected the auditory nerves more painfully than that made by iron ordnance.

CONCERNING TEETH.

A note upon late experiments, relative to the readiness of digestion of varieties of food, brought up Mr. Fisher, who advocated the more thorough comminution of food on the score of health and economy. In the rambling discussion which ensued, one speaker presented the testimony of a late French *savan*, who maintains that the superiority of an Indian's teeth, for example, is due to the fact that, from insufficient cooking of their food, they are obliged to make great use of them; that the dentist's occupation was a sign and concomitant of excessive civilization. The dentists present denied the charge, affirming that rudimentary teeth of both sets were formed before the birth of the child; that the mastication of food in no way entered into the question, excepting perhaps in the case of the mother; and that the Indian had better teeth simply because the constitution of the generality of their females was better than that of the civilized woman.

Some other topics of minor note occupied the controversial powers of the members during the remainder of the evening, and the Society adjourned at a late hour.

Birkhols' Metal.

We see it stated in the papers that A. Birkhols, formerly of Colt's factory in Hartford, the inventor of a metallic composition resembling brass, for the manufacture of which a company has been formed in Providence, R. I., with a capital of $300,000, has sold his patent to them for $40,000 of the stock, three cents duty on every pound manufactured, and a salary of $4,000 for superintending the manufacture.

The following is a copy of the patent:—

Be it known that I, Alexander Birkhols, of the city and county of Hartford and state of Connecticut, have invented or discovered certain new and useful improvements in the composition of cast metal, by means of which greater strength is acquired, and I do hereby declare that the same is described in the following specifications.

So as to enable a person skilled to make the same, I will therefore proceed to describe its component parts, the essential ingredient of which is cast iron. To make one hundred pounds of this composition, I first take two pounds of cast iron, two ounces of charcoal, put into a crucible and heat to a white heat. I then add thereto sixty pounds of copper. Heat till both are melted together, then add four ounces of borax and thirty-eight pounds of zinc.

The mode of proceeding during the melting is much the same as with all other metals melted in crucibles. When melted it may be poured into molds or bars suitable for the forge or rolling mill. Its strength is estimated to be eight thousand pounds greater to the square inch than the best wrought iron, rendering it far more valuable for various purposes.

The proportion of parts may be varied, which will only change proportionably the desired effect, viz., greater amount of strength and solidity; but I believe that the proportions about as described will be best for all practicable purposes. I have described its component parts and the mode of proceeding to produce my improved composition, so as to enable a person skilled to make the same.

What I claim, therefore, and desire to secure by letters patent, is the introduction of cast iron into a composition composed of copper and zinc in about the proportion, substantially in the manner as described.

ALEXANDER BIRKHOLS.

The Uchatius Process.

Many of our readers will still recollect an interesting invention made by M. Uchatius, an officer in the Austrian service, and which was first brought under public notice at the Paris Exhibition of 1855. It is a direct method of steel manufacture by mixing granulated cast iron and iron ore, in proper proportions, in a crucible, and by these means forming the exact combination required for any given quality of steel. In 1856, at the same time when Mr. Bessemer's invention had been pronounced to be a failure, this process was at the hight of its renown, and experiments were made in France and in England on a more or less large scale, although not in anything like commercial practice, to test its value. A company was formed in France, and, we believe, under the auspices of the Government, for the working of M. Uchatius's patents, and everything then believed to be necessary for steel manufacture on a large scale was provided. The causes of failure in this instance are now perfectly intelligible, since the advancement of what may be called the science of steel manufacture has, since that date, enabled us to judge of the importance and value of certain details which were then unknown or overlooked, and the absence of which caused the practical failure of a process which in principle was perfectly correct, and would have in time become of considerable importance, had it not been surpassed by the progress of a still more glorious and revolutionizing invention, viz., the Bessemer process. The Uchatius process, however, has been commercially introduced at one place, and the steel works has continued its operations now for about ten years, and so far as can be judged from the excellent quality of its products, and from the continuance of this mode of manufacture with perfect success. The steel works referred to is at Wykmanshyttan, in Sweden. In 1862, this concern sent Uchatius steel to London, which was remarkable for its tenacity and uniformity of grain, and now in the Paris Exhibition we find the same works represented by another excellent collection of the Uchatius steel. We understand that the Uchatius steel of Wykmanshyttan is used exclusively by the royal mint at Stockholm for dies of coining presses, polished rolls, and other similar articles requiring steel of great strength and closeness and uniformity of grain. The reason why this process succeeded in Sweden and failed in France and in England is the same which made the Bessemer process first succeed in that country, viz., the purity of the Swedish ores. The ore employed for the Uchatius process at Wykmanshyttan is that of the Bisberg mines, which can be seen in its natural state at the Paris Exhibition, forming part of the large trophy of ironstone and iron erected in the Swedish machinery gallery. It ranks among the purest and richest magnetic ores to be found anywhere. From this ore and from granulated pig iron made of the same ore, probably mixed with iron containing manganese, if the original granulated iron does not contain a sufficient dose of this latter metal, the Uchatius steel is made. The production is not inconsiderable, and the article finds a market at Gefle, principally in the form of a bar steel of small dimensions, at a price of 30s. to 35s. per cwt. Uchatius' process would have become a practical success in England, had it not been swept away by Mr. Bessemer's invention before it had time to establish itself in practice. The steel manufacturers of this country and the public at large have all reason to be satisfied with the historical coincidence of the two inventions, since there would otherwise, and had Bessemer followed behind Uchatius, have been two revolutions to be passed through instead of the one which has taken place. We should have had to change from the old mode of steel conversion to the Uchatius process, and ultimately again from that to the Bessemer process.—*Engineering.*

Animal Grafts.

Plastic surgery recognizes life in a part and grafts one portion of the body on another, or replaces a portion of a nose or a finger when lopped off, and witnesses its continued growth. In lower animals this principle is more astonishingly developed. Cut a polyp into a dozen pieces and each fragment will develope itself into an independent and perfect type of the species. A French naturalist, M. Vulpian, cut off the tails of tadpoles, and saw them not only live but grow for ten days, indifferent to all theories of nervous centers, digestive apparatus, or circulatory systems. But the member that seems to have the strongest dose of the "vital principle," is the tail of a rat. This is the very ideal of life, and here, if anywhere, we ought to locate the seat of vitality. The following experiment was made by Mr. Bert. He dried a rat's tail under the bell of an air pump, and in immediate proximity to concentrated sulphuric acid, so as gradually to deprive it of all moisture. Then he placed it in a hermetically sealed glass tube for five days. At the end of this time he subjected it for a number of hours to a temperature of 98° Cent. in a stove, and subsequently sealed it a second time in his tube. Four days more having elapsed, he united this tail by its cut extremity, to the freshly cut stump of a living healthy rat, and quietly awaited the result. His success was as complete as it was marvellous. It commenced to expand and perform the natural duties of a tail, and three months afterward he demonstrated by a second amputation, and a careful injection, that it was furnished with proper vessels and was a living part of the second rat!

What rich lessons practical surgery may learn from such experiments, can be imagined. A careful anatomist has transplanted a fragment of bone from the skull of one rabbit to the skull of another, and found it form adhesions and replace the lost portion perfectly. A piece of periosteum taken from a rabbit twenty-four hours after death, grew and produced bone when grafted neatly on a living animal of the same species. Nerves also have been removed from one body to another with success, and some very singular results noticed where a portion of a motor was excised and supplied by a fragment of a sensory filament. The diseases to which grafted members are subject, after they have been exposed to certain re-agents, are also full of hints for the pathologist and the physician.—*Medical and Surgical Reporter.*

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The East India telegraph is progressing through China.

There is only about a quarter of the shipping tunnage building in Maine at present compared with last year.

England uses 850 million postage stamps annually, France 450 and the United States 350 millions.

The efforts of the French Emperor to increase the extraction of coal in France, have been so far successful that from 13,000,000 to 14,000,000 tuns will probably be mined this year. Rather an insignificant amount compared with the coal production of America or England.

The cities of Bombay and Singapore, India, have for two years past been lighted with gas made from coal brought from Australia. This coal besides being cheaper, is quite free from sulphur, so that the gas is easily purified, and a larger supply of coal may be stored without deterioration or danger from heating.

The ties for the Kansas Pacific Railroad will cost a dollar each. The coal must be transported 200 miles.

The Prussian King has accepted the present by Krupp of his monster gun now in the Paris Exposition, and its ultimate destination will be some coast battery.

A California paper says that the company engaged in taking out borax in Lake county, will soon be in condition to extract five tuns of this article per day from the Borax Lake.

Gold dust to the value of $800,000, arrived at St. Louis, from Montana, on the 9th inst., the largest consignment received at one time.

Maine claimed recently to possess the oldest locomotive in America. It was broken up the other day at a Bangor machine shop. This locomotive was the "Pioneer," a ten tun engine, and was one of the early machines built in England by Stephenson, the inventor of the locomotive. It was built at Newcastle-upon-Tyne, in 1835, and ran its first trip November 6, 1835. Its last work was done August 15, 1867.

Diamonds have been found in the Cape colony, in the neighborhood of the Orange river, by some Amsterdam prospectors; one of the gems is valued at $5,000.

It appears from quarterly returns made by the various manufacturers of sewing machines in this country, that during the year ending June 10, 1867 there were manufactured and sold 151,135 double-thread, and 18,970 single-thread machines.

The first paper mill built in the United States was erected at Roxborough, Pa. 1693. The second mill was built at Elizabeth, N. J., in 1728, during which year the first mill in Massachusetts was built in Boston. In the year 1860 the number of paper manufactories in the United States was 555, their totol product, being valued at $21,216,893. Of these manufactories New England had 204; the Middle States 273; the Western States 54: the South 24. The increase since that year has been very large.

The American Fishhook company of New Haven, Conn., turn out from each machine, one hundred fishhooks per minute.

The Boston Hartford and Erie railroad by the first of next month will have their road in operation to Mechanicsville, Ct., where a junction will be made with the Norwich and Worcester railroad.

The largest journal turbine wheel ever built in the country, is being constructed for the Fairmount water-works of Philadelphia. Its diameter is ten feet three inches: weight, including gearing etc., about 200,000 pounds.

Some of the Lowell cotton mills which have been slacking up for a few months past, are again pushing business.

The amount of capital expended on the Suez canal, last year was $10,000,000. The estimated amount still required to be expended before the work will be completed, is said to be $20,000,000.

For improving the navigation of the Mississippi river, Government has authorized the construction of a canal seven and a half miles in length, around the Keokuk rapids. The contract for the removal of obstructions in the rapids just above Rock Island, has been awarded, and among the novel means for rock excavation, is an immense drill weighing over four tuns, which with a fall of thirty feet, it is reported, plows into the solid rock more than four feet at a single stroke. It would interest us to be informed of the structure of the rock where such extraordinary results could be attained.

Work on the Manassas Gap railway, is progressing very rapidly about three hundred hands being employed. The rails are now being laid between Piedmont and Markham, and the track graded and readjusted to the summit of the Blue Ridge.

The production of coal this year has not reached that of 1866 but the great falling off in the demand for manufacturing purposes has caused a great reduction in rates. Prices are now so low that the mines are not making any money, and it is predicted that many small companies formed during the past two or three years, must succumb to the general stagnation.

The first sample of pig-iron ever made on the Pacific coast is on exhibition in San Francisco.

The contract for building the mountain section of the Pacific railway, some six hundred miles in length, has been awarded to Mr. Oakes Ames, who is to receive therefor over $47,000,000. This is the largest railway contract ever made in this country.

The California gold mines are said to be yielding more freely than ever before. As a specimen; near Smartsville upwards of $1,000,000 of gold have been taken from one claim of 100 acres, since March 1864. "It takes a mine to work a mine" says an old Spanish proverb, and to open the mine under notice, took nine years of incessant labor, and an enormous expenditure of money. It has four miles of sluices, three rods wide and three feet deep, in which is distributed three tuns of quicksilver to catch the gold. The water used in washing costs $25,000 per annum, and 125,000 pounds of powder are expended annually in blasting.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

ATTACHMENT FOR GRAIN CLIPPER OR HEADER.—Samuel Manning, San Francisco, Cal.—This invention relates to a new machine to be attached to the ordinary clipper or header, for the saving of grain, which is fallen or blown down, commonly termed "lodged grain."

CARRIAGE SPRING.—Thomas De Witt, Detroit, Mich.—This invention consists in the application of fixed studs to a carriage spring, composed of two parts connected together and arranged in such a manner that a spring superior to the ordinary elliptic spring is obtained.

LOUNGES, SOFAS, BED BOTTOMS, CHAIRS, ETC.—Casper Martino, Trenton, N. J.—This invention has for its object to furnish a neat, convenient, secure, and reliable means of securing coiled wire springs, in a position in lounges, sofas, chairs, bed bottoms, etc, and for raising and lowering a movable part of such articles.

DEVICE FOR HITCHING HORSES.—J. B. Thornton, Madison, Wis.—This invention relates to a device to be attached to the inside end of carriage wheel hubs by means of which, if the horse or horses harnessed in and to the carriage be hitched to such device, upon any attempt to move forward the wheel is turned sufficiently to draw in the rein, and thus to stop them; while if they move backward, the devise is free to slip around the wheel hub, and no harm thus occasioned.

SPADE.—W. H. Miller, Brandenburg, Kentucky.—This invention consists principally in a novel attachment of the handle for operating the tines constituting the rake, to throw them into position for use as a rake or as a spade.

RAILROAD STATION INDICATOR.—George T. Lape, Summit, N. Y.—This invention relates to a new and useful mode of constructing apparatus for indicating to passengers in the railroad car the names of stations as they approach or pass them, in the distance, between them and the termini of the road.

DEVICE FOR MIXING FLUIDS.—George Watkins, Brooklyn, N. Y.—This invention relates to a new and improved device for mixing and agitating fluids, and it consists in a novel means employed for operating the revolving beaters whereby the latter have two motions, a rotary one on their own axis, and another in a circle, around the tub or receptacle in which the fluid to be mixed is placed.

PETROLEUM STEAM HEATER.—Lewis R. Wiggin, Farmington, N. H.—This invention which relates to device for heating tar, wax, glue, blacking, oil, and other articles used for chemical and mechanical purposes, consists of a double bottomed tank or receptacle for the substance to be heated, and of a standard through which water is conveyed between the two bottoms, and rising into a steam generator, from the top of which passes a worm coiled in the tank. A chimney passes through the steam generator, at base whereof a petroleum or kerosene lamp or other source of heat is placed.

SETTER FOR SAW MILL.—Titus Whitmore, Dubuque, Iowa.—The object of this invention is to provide a device by which the logs may be set automatically to a circular mill saw for manufacturing lumber, and consists in providing an index plate made in the form of a disk with a cam, and a crank lever located upon a shaft, for the purpose of throwing off the set of the log to the saw, when it has gained the point designed for the thickness of lumber.

LADDER.—B. F. Turner, Bridgeton, N. J.—This invention consists in the application of hooks to one of the sections or lengths of the ladder, whereby the uppermost section or length may be adjusted to reduce the length of the whole ladder, as may be required. The improvement further consists in the application of a base whereby the ladder may be held firmly in an upright or slightly inclined position, without leaving it against any support. The improvement consists, lastly, in an adjustable or reversible platform, whereby the device may be used as a slip ladder.

SECURING KNOBS TO THE ARBOR OF LOCKS.—D. B. Cobb, Jersey City, N. J.—This invention relates to a new and improved means for securing knobs to the arbors of locks, whereby a very strong and durable connection of the aforesaid parts is obtained, and one which admits of a very ornamental and chaste appearance being given the knob.

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DEVISE FOR BENDING OR SWAGING SHEET METAL PLATES FOR COVERING SASHES FOR GREEN HOUSES, SKYLIGHTS, ETC.—John N. Woodward, Aurora, Ill.—This invention relates to a new and improved devise for bending or swaging sheet metal plates for covering the exterior portions of sashes for green houses, skylights, etc. The object of the invention is to obtain a device for the purpose specified, which will be simple in construction, capable of being manipulated with facility, and which will admit of the work being performed with rapidity and in a perfect manner.

HYDRO-CARBON VAPOR MACHINE.—James T. Spence, Brooklyn, N. Y.—This invention relates to a new and improved machine or apparatus for vaporizing volatile hydro carbons for illuminating purposes, and consists in a novel and improved means for creating a draught of atmospheric air through the chambers containing the material to be vaporized, such for instance as the light grades of coal oil, naptha, gasoline, etc., and also in improved valves for checking the draft whenever the apparatus ceases its operation. The invention finally consists in the use of a combination of heavy hydro-carbons, or those which vaporize at quite a high temperature with that of a lighter grade, whereby all danger of explosion is avoided. The invention has for its object the production of a steady light, a large vaporizing surface within a limited space, and safety from explosion in using the apparatus.

CULTIVATOR.—Isaac B. Mahon, Dunkirk, Ohio.—This invention relates to a new and improved cultivator for cultivating crops which are grown in hills drills, and it consists in a novel construction of the device whereby a very durable implement, for the purpose specified is obtained.

TRUSS.—Frederick W. Neubert, Pittsburgh, Pa.—This invention relates to a hernia truss which is so arranged that it can be applied for ruptures on either side, or even for double ruptures, and can be adjusted on bodies of different size.

MANGER, FEED BOX, ETC.—Friedrich Denzler and Jacob Miller, Brooklyn, E. D., N. Y.—This invention relates to such a connection of mangers, feed boxes, or feed troughs, with ordinary clockwork, that the same can be automatically opened at the necessary time, not requiring any attention after the boxes or troughs have been filled, closed, and the clockwork arranged. The object is to economize time and labor, especially in large dairies, studs, and stables, and to provide regularity in the time of feeding, the apparatus being so arranged that any desired number of troughs or boxes will be simultaneously opened from or by means of one clockwork, with which they are connected.

ICE-CREAM FREEZER.—Francis H. Duc, Charleston, S C.—This invention relates to a new device for freezing ice cream, and consists in the use of a revolving cylinder in which the cream is held, said cylinder being fitted around a stationary shaft which carries a wing for feeling or indicating the state of the contents.

HOSE COUPLING.—John Kerns, New York city.—This invention relates to a hose coupling of such construction that two pieces of hose can be secured to each other by its use, without a wrench, or even without turning a ring or a nut for the purpose. All that is required to connect two ends of hose is to hold them together, and push one toward the other, and the connection will be complete, safe, and strong.

GARDEN TILE FOR BORDERING.—Francis B. Fancher, Lansingburgh, N. Y.—This invention relates to an improvement in the construction of tiles for the edges of walks, flower beds, and grass plots, in gardens and other ornamental grounds, and consists in forming the tile with a right-angled wing or wings, on one or both sides, and locking the tiles together with lap joints, or tongue and groove, in such a manner that they may be set in the ground with one edge projecting above the surface to divide a flower bed or grass plot from a walk, or to enclose a border on both sides.

MODE OF SECURING FELLY JOINTS.—James W. Lawrence, New York city.—The nature of this invention consists in securing the ends of fellies in a in a wheel by means of a bolt through the joint and the felly-plate in such manner that the ends will not split or crack when the tire is set up, nor work loose and uneven laterally and radially from service, but will form a tight joint of great strength and durability.

THREE WHEELED VEHICLES.—John W. Minor and David P. Ward, New Bedford, Mass.—This invention relates to improvements in wheeled vehicles, and it has more particular reference to those vehicles which are used for the transportation of heavy burdens, as trucks or drays, and it consists in the peculiar arrangement of a third or guiding wheel to the forward end of the said vehicles.

DISTANCE INDICATOR FOR VEHICLES.—James C. Spencer, Phelps, N. Y.—This invention relates to an improvement in the construction of an Odometer, or distance indicator, for vehicles, and consists in a spur wheel placed in a box to be attached to an axle of any vehicle which is revolved by means of a screw or worm that receives motion by means of a pawl and ratchet, with every revolution of the wheel.

TRACE AND PAD BUCKLE COMBINED.—E. B. Winslow, Chatham, Ill.—The object of this invention is to fasten the trace and pad strap with a buckle, serving the purpose of two buckles, usually employed, making a large saving of strap leather in the harness, while the pad is lighter, stronger, and neater, and cheaper than any in use.

HARVESTING MACHINE.—J. M. Peters, Jr., Ganville, Ohio.—This invention relates to a new and improved harvesting machine, designed for general purposes, to wit, the cutting of grass and grain and standing corn stalks, and it consists in a novel construction of the frame of the machine, arrangement of the driver's seat, cutting device, etc., whereby the device is rendered capable of operating perfectly in cutting all standing crops.

WATER AND GAS METER.—Joshua Mason, Paterson, N. J.—This invention relates to a new and improved water and gas meter, and consists in a novel construction and arrangement of parts whereby water or gas may be measured in the most accurate manner and by a means not liable to get out of repair or become deranged by use.

CULTIVATOR.—Elijah Stafford, Decatur, Ill,—This invention relates to a new and improved cultivator of that class which is designed for cultivating crops grown in hills or drills, and consists in a novel arrangement of crank axles whereby the plows may be adjusted higher or lower, so as to plow more or less deep, as required, and all the plows of the machine graduated so as to plow an equal depth. The invention further consists in a novel arrangement of the plow standards and in a peculiar shape of the plows, whereby the latter are prevented from clogging or choking.

MODE OF COVERING STEEL WITH COPPER.—E. T. Ligon, Demopolis, Ala.—This invention relates to the covering of steel with copper.

PISTON.—Nathan Hunt, Salem, Ohio.—This invention consists in so forming and arranging the parts that no holes, valves, or springs are required, while the piston is self packing, the rings being expanded by the pressure of the steam.

SUBMARINE PLOW.—Edwin T. Ligon, Demopolis, Ala.—This invention consists in attaching to the side of a steamboat or other vessel a submarine plow which by its action on the bottom of rivers and other waters displaces the sand, mud, and other loose material, and thereby excavates a channel and deepens the water for purposes of navigation or for other purposes.

ADJUSTABLE MEASURE FOR PACKING LIQUIDS.—Joseph L. Abbott, North Providence, R. I.—This invention relates to a new and improved measure whereby liquids may be drawn from a tank or reservoir in certain limited quantities very expeditiously. The invention is more especially designed for the drawing off of coal oil and turpentine from large tanks or reserveirs in specific quantities for canning, and has for its object the varying of the capacity of the can to suit the variation of measurement peculiar to different countries, as the gallon, for instance, which varies materially, an "imperial" gallon being larger than the gallon United States measurement. The invention has further for its object the ready admission of the oil or other liquid into the measure by providing a free escape for the air therefrom during the process of filling; and finally the invention has for its object a speedy withdrawal of the contents of the measure without loss by leakage or drip in adjusting the cans to or removing them from the discharge faucet of the measure.

ROLLING MACHINE.—Hugh Baines, Manchester, England.—This invention relates more particularly to a rolling machine invented and secured by Letters Patent of the United States bearing date Dec. 11, 1860.

TUBE EXPANDERS.—E. J. Moore, East Boston, Mass.—This invention consists in arranging a stock with a number of rollers placed therein with beads formed on them, which rollers are so adjusted in the stock that they can be pressed outward by a tapering pin which passes through the stock and operates upon the rollers.

COMBINED HOE AND RAKE.—Isaac Cook, Haynesville, Mo.—This invention relates to an improvement in the construction of a combined hoe and rake, and consists in a device for securing them to the handle together or separately.

WINDOW SASH.—Robert Thomas, Parkersburgh, West Va.—This invention has for its object the fitting of the sashes within the frame of the window in such a manner that the sashes may be removed from the window frame and fitted therein with the greatest facility, and without removing or detaching stops, parting beads, and other parts pertaining to a window frame, as is now necessarily required.

BALING PRESS.—S. J. Austin, Freeport, Me.—This invention consists in novel means employed for operating the platen and the expanding side of the press box, and also in a peculiar construction of the platen and head block, and other features, whereby a very simple, efficient, and durable press is obtained, and one which may be operated or manipulated with the greatest facility.

CHURN DASHER.—J. W. Pettingill, Rockford, Ill.—This dasher for churns in fact embraces two in one it working to crush or mash the cream without a rubbing or grinding movement, which as is well known, has a tendency to leave the butter soft and salvy while it mashed or crushed it is rendered hard and brittle.

WEATHER STRIP FOR DOORS.—J. H. Miller, Milwaukee City, Wis.—This invention consists in so hanging and arranging the weather strip that when the door is closed it will be brought down and upon the sill of the same in proper position for preventing the passage of air, dust, etc., under the door, while as the door is opened it will so swing or turn as to pass freely over the sill and offer no obstruction to the movement of the door.

CART.—N. W. Godfrey, Locust Valley, N. Y.—This invention principally relates to the construction of the bottom of a cart whereby, when so desired, it can be simultaneously opened at various points of its length and width for dumping the material contained in it upon the ground or any other desired place and in the most easy, convenient and ready manner.

DOUBLE-ACTING FORCE PUMP.—John C. King, New York City.—This invention relates to a steam pump in which the circumference or rim of the cylinders is connected with, attached to and moving with the piston, between the stationary heads, thereby doing away with piston rods and piston packings. The ports pass through the stationary heads, and the water or steam is acted upon by the motion of the piston in the same manner as in ordinary cylinder engines.

PORTABLE SHEEP SHED.—Wilson M. Baker and John Hisner, Urbana, Ohio.—This invention has for its object to furnish an improved portable sheep shed so constructed and arranged that it may easily be transported from place to place, and that the sheep may be protected from the weather and easily and conveniently fed.

BOLT.—A. H. Sherwood, Southport, Conn.—This invention consists in the combination with two bolts which are connected together by a toggle, the one for securing the top of the door, and the other the bottom, and of a catch so arranged as to automatically catch upon a hook or the like secured to the siding of the house or building for holding the door open.

HORSE-POWER.—S. Coin, Cazenovia, N. Y.—This invention relates to that class of horse-powers in which an endless platform is employed on which the horse travels and thus imparts power, and it consists more particularly in a novel construction of the link pieces for the several sections of the platform in their application and attachment to the platform sections, the iron tie rods heretofore used are dispensed with, and the machine not only much simplified but made lighter, and its cost of construction diminished.

FRUIT BOX.—Israel F. Brown, New London, Conn.—The objects of this invention are first, to construct a fruit box in such manner as to avoid all shrinkage of the wood of which the box is made, and second, to obtain a simple, cheap and efficient fastening device or devices for the bottom to the sides or other portions of the box.

BELTING FOR MACHINERY.—M. A. Strouvelle, St. Louis, Mo.—This invention or discovery relates to a new and improved mode of making belting for machinery and consists in preparing and curing hides without tannin.

CARRIAGE JACK.—Joseph F. Emmert, Quincy, Pa.—This invention relates to a new and improved carriage jack which is operated by a lever to raise a sliding rack. It is made wholly of cast iron and is both cheap and convenient.

PRESERVING MEATS, GAME, ETC.—Edward de la Granja, Boston, Mass.—This invention is designed for the preservation of all kinds of meat, game, poultry, etc., used for human food, and when the process is properly followed it will preserve such meats, etc., in a perfectly sweet and edible condition with but a trifling expense.

SHIFTING RAIL FOR CARRIAGE TOPS.—Patrick G. Clancy, Augusta, Me.—In this invention the carriage top is fixed to a rail which can be easily attached to or detached from the seat. The means for attaching and detaching it are short hooked projections on the rail catching in eyes in plates attached to the seat and held in position in the eyes by shortening the rail. The rail is made extensible by means of an independent piece screwed into its center, by right and left screws.

HERNIA TRUSSES, ETC.—William Pomeroy, Brooklyn, N. Y.—This invention has for its object to so improve the construction of hernia trusses, abdominal supporters, etc., that the tension of the body spring and the position of the pressure pad may be adjusted at pleasure.

CLOTHES DRYER.—D. B. Randall, and A. A. Williams, Glover, Vt.—This invention has for its object to furnish an improved clothes dryer, simple in construction easily and conveniently used and operated and which will occupy little space in the room in which it is placed.

CHURNING MACHINE.—M. V. B. Rowley, Worcester, N. Y.—This invention has for its object to furnish an improved machine by means of which a churn may be operated at any desired speed, steadily and regularly, bringing the butter in a very short time.

FENCE.—Daniel Kaufman, Boiling Springs, Pa.—This invention has for its object to furnish an improved fence so constructed and arranged that the posts will be no more liable to decay than the boards or rails, which may be easily set up and taken down and conveniently moved from place to place.

FOLDING CHAIR.—E. W. Vaill, Worcester, Mass.—This invention relates to that class of folding chairs in which the seat is supported on crossed legs which fold together; and consists in a new method of constructing and hinging the arms and back of such chairs, by which the whole chair is more neatly and compactly folded together, the back folding forward over the seat, and hanging in front of the legs.

FOLDING CHAIR.—E. W. Vaill, Worcester, Mass.—In this invention a new method of pivoting the arms to the front part of the seat is employed, by which the chair is more neatly and compactly folded together.

ROUNDING FLY NET STRAPS.—Cornelius K. Burkholder, and Henry Lerew, York Springs, Pa.—This machine has two jaws, one movable; to these are attached guides whose apertures correspond with the square shape of the strap as it is fed into the machine, and knives whose semi-circular notches give the required rounded form to the passing strap.

GRINDING MACHINE.—Menno A. Diedrichs and J. H. Diedrichs, Baltimore, Md.—This invention relates to an automatic arrangement for holding and feeding the article to be ground in relation to the stone, and in the means for adjusting the different parts to suit different sizes of tools etc.

VEGETABLE PLOW.—Wm. Richardson, Hookstown, Md.—In this invention of the three plow points, the forward one is removable and the two rear ones are adjustable both laterally and vertically. The object of constructing a plow in this manner is to adapt it to plowing between rows of different distances apart, and to adjust it either to surface or subsoil plowing, as may be desired. It also pulverizes the ground more thoroughly than the common plow.

INVALID SPITTOON.—John M. Cayce, Franklin, Tenn.—In this invention the cover of the spittoon is raised by the act of lifting the instrument and falls by its own weight when the spittoon is set down again.

WASHING MACHINE.—Albert Dennison, Stillwater, N. Y.—This invention relates to that class of washing machines in which the clothes are placed in a revolving box, together with loose balls, and cleaned by the action of the balls, in connection with the water. The invention consists in making the box a polygonal prism, instead of a cylinder and in the peculiar construction and attachment of the journals and journal boxes.

IMITATION WOOD.—Henry Carter, Taunton, Mass.—This invention relates to a new composition for making imitation wood from the dust of those kinds of wood which it is desired to imitate, and to a new process of ornamenting such imitation wood by means of metal shavings.

PIN.—A. R. P. Walker, Richmond, Me.—This invention relates to an improved pin for brooches, shawls and like purposes, and consists in dispensing with the rivet and hinge as ordinarily used by bending the pin itself through the eye.

PUNCH.—Edward Shindler and Charles H. Metzger, Easton, Pa.—The object of this invention is to construct a tool for punching leather or any other material of a similar nature in an accurate and expeditious manner.

FURNACE FOR SMELTING ORES.—A. H. Richardson, Denver, Colorado.—This invention, which relates to an improvement in furnaces for smelting silver, consists in directing a blast upon the treated ores with charcoal in a furnace having three apertures at different levels for the separation of the slag silver and lead by gravitation.

COMBINED CHAIR, LOUNGE AND STEP LADDER.—Joseph Gerdon, Jr., West Albany, N. Y.—This invention relates to a new and useful device which will be of great use in stores and magazines of all descriptions and which is so arranged that it can be set up as a chair, step ladder or lounge, as may be desired.

TRACE ATTACHMENT.—Andrew Thompson, Ottumwa, Iowa.—The nature of this invention consists in attaching to a harness trace a metal point or end having ratchet teeth or a series of projections on the upper side which catch a clamp for fastening the trace.

STEAM ENGINE.—Thomas Adams and George John Parson, Adelphi, Eng.—This invention consists in certain improvements in slide valves, which are also applicable to pistons and glands. The object is so to construct a valve that the effect of the steam, acting on the back of the valve shall be equal to the effect of the steam acting on the face of the valve; but should the surfaces acted on by the steam not be opposite each other, then the areas of such surfaces, multiplied by the distance of their centers of action from the center of the valve (being the leverage with which the steam acts) should be made equal.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

N. U. A., of Mass., asks if we can inform him of any cement for steam pipes which dries quickly and is durable? We know of no better cement than that ordinarily used, composed of red and white lead mixed with linseed oil. It sets readily, especially when subject to compression. Our correspondent is, of course, aware of the constituents of the permanent joint made of iron borings, sal-ammoniac, sulphur, and water. The proportions of both the above we have published several times. Rubber makes an instantaneous joint without cement.

E. V. R., of Mich.—The molds or matrices for casting glass bottles having raised letters or other devices on their exterior surfaces, are made of iron or brass and produced by casting from a wooden pattern, then finished up and fitted with the proper hinges or connections. The process is as simple as any other job in pattern making, molding, and finishing.

S. J. T., of Ga., desires a recipe for making the plaster of Paris stick to mill stones. Much of his work in this line puffs up and soon comes off. We know of no mystery in this operation. The requisites are fresh plaster and a clean stone.

C. R. C., of Ill. has a twenty-four inch gum belt which slips on the pulleys, one of which is of iron and the other of wood. He is told that tallow will spoil rubber belts, has used rosin, but it seems to glaze the belt and make it worse than before. Ans. Animal oil will not do for rubber belts. If the belt slips it should be lightly moistened on the side next the pulley with boiled linseed oil—cold—and repeated if one dose does not answer.

J. H. S., of Ohio asks how he can harden and temper the boards for cultivator plows, which have to be heated and pressed to form, without danger of their springing. We know of no certain way of tempering curved sheets of steel without springing, except hammering to shape after the tempering is done.

J. S. L., of Pa.—For producing the different grades of brass, etc., we refer you to the "Tinman's Manual," published by I. R. Butts & Co., Boston, Mass. We have published the recipes several times.

E. W. D., of Conn.—In our statement on page 121, current Vol., that we "did not know of any dynamometer to be applied to the shaft which is entirely reliable," we intended no injury to any inventor of dynamometers. If the machine you speak of is so entirely reliable under all circumstances the fact has escaped our notice, although we are tolerably well acquainted with the machine. Its superior merits ought to procure its general introduction and obviate the necessity for a better measurer of power.

L. M. C., of Iowa.—In 1663, the magnetic and geographical meridian of the city of Paris coincided. From this time forward the declination proceeded westward till it reached its maximum in 1814 when it was 22°, 34′, W. Since 1814 the declination has receded. In 1860 it was 19° 32′ W. In London it was at 0° in 1663, reached its maximum west declination of 24°, 41′, in 1818, and was 20°, 25′ W in 1866. The line of no variation is an irregular line, and at present cuts the east of South America, passing east of the West Indies, enters North America near Philadelphia and traverses Hudson's Bay, thence it passes through the North Pole, entering the Old World east of the White Sea, traverses the Caspian, cuts the east of Arabia, turns then toward Australia, and passes through the South Pole to join itself again. No satisfactory explanation has ever been given of the variation of the needle,

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Iron Manufacturers and Capitalists—Examine the Model Rolls at the American Institute. Patent for sale. P. Bright, Philadelphia.

For Sale—A small Metal-working Shop—Tools in good order. Also, two patents. Terms easy. Address G. Strong, care H. N. Meyers, 218 Fulton street, New York. 14 & 15

Wanted—Address of Makers of Toy Steamboats with small working engine,—W. C., Box 104 Mount Vernon, N. Y.

Gould's Bottle Stopper.—The Patentee states that his invention, which was illustrated on page 180, is better adapted for cider, ale, and porter, than for soda or other aerated waters.

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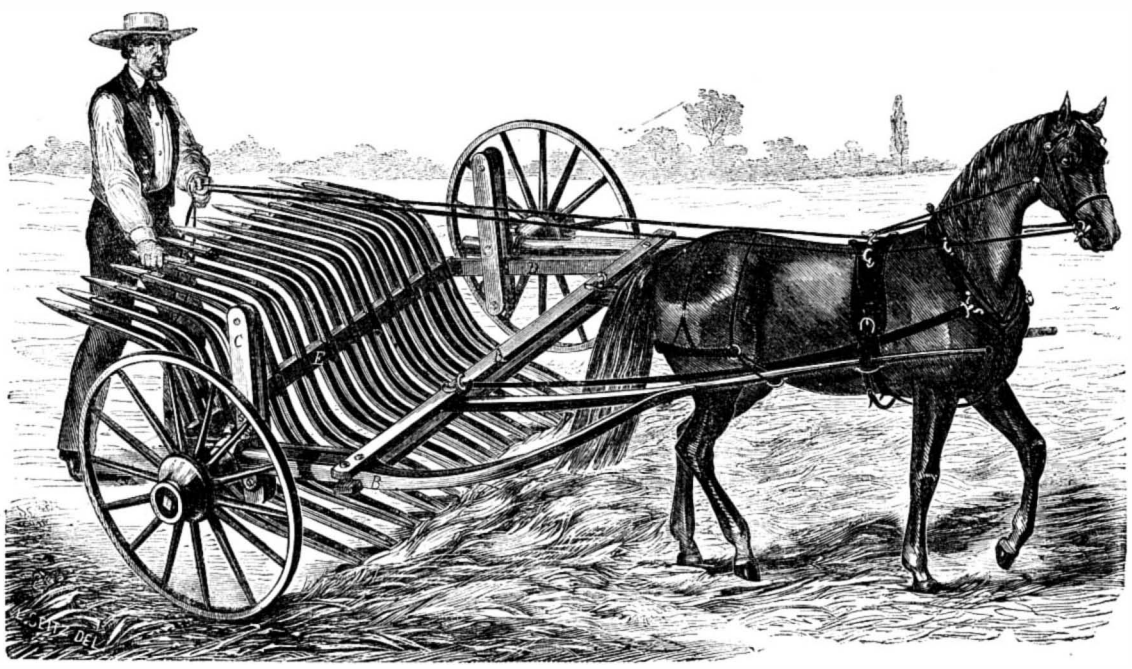
Improved Horse Hay Rake.

The rake represented in the engraving has taken a premium wherever exhibited and tested. In the Indiana State Fair of 1866 it received the first prize over all others, including one which carried off the first premium at the Auburn, N. Y., trial. It is uncommonly light, very strong, and handy in operation. With it there is no necessity of shocking the hay previous to stacking it, as it will carry an ordinary sized shock to any part of the field. It works well on very uneven ground. It was contrived to answer a call for a more perfect rake published in the Scientific American, Vol. XIII., No. 12, page 176.

The thills are bolted to a double cross bar, A, to the ends of which are also bolted the curved hounds, B, the forward ends of which are securely united to the thills, thus strongly bracing the structure. These hounds extend back of the crossbar and have their rear ends made cylindrical and quite large to receive the rings of the short axletrees or journals on which the wheels turn. These axles are of metal and may be adjusted on the hounds to bring the wheels further forward or back, as may be desired, to properly balance the rake, and are held in position by set screws. Firmly secured to flanges on the inner end of the axles are upright guides, C, in which play the draft bars, D, which are pivoted to the hounds just in the rear of the crossbar, A, and at their rear ends support the rake head, E. This is pivoted to the draft bars by headed journals which allow the rake to be revolved.



FREDERICK'S PATENT REVOLVING RAKE.

The rake head is square and the teeth are double or made of two curved pieces of wood, which are seated in mortises on opposite sides of the head and are bolted through. At their ends the two parts of the tooth are brought together and held by rivets or screws, and strengthened and protected by shoes of malleable iron. This method of construction makes a very strong and at the same time a very light tooth.

In operation, the driver guides the horse with one hand and manages the rake with the other, as seen. He can easily, by depressing the rear ends of the teeth, elevate the forward ends to avoid obstructions or to accommodate the rake to unevenness of surface, while the guides, C, permit the draft bars to rise and fall. The rake head may be set higher or lower by means of adjustable blocks in the lower part of the guides, C. The rake will revolve for unloading in the usual way by removing the pressure of the hand.

This rake was patented through the Scientific American Patent Ageney, Aug. 6, 1867, by Levi W. Frederick, who may be addressed for rights to vend and manufacture, or for other information, at Gosport, Owen county, Ind.

Improvement in Screw and Ratchet Wrenches.

Two views of an improved wrench are shown in the accompanying engravings. The object is to relieve the screw (if one is used) from the whole strain exerted in setting up a nut or bolt by introducing a stop-catch with teeth which engages with a rack or ratchet cut on the shank of the wrench. It is, in one form, a combination of the screw wrench and the ratchet wrench, and in another form, is a simple ratchet wrench.

Fig. 1 is the ratchet wrench, *per se*. The movable jaw, A, can be slipped to position by the thumb and finger, and held by the catch, B, which engages, on its under side, with two of the teeth of the ratchet rack, when shut to place, where it is held by the spring, C, that acts like the spring of a pocket knife. The plate, D, is a permanent portion of the jaw and thimble, A, and, of course, moves with it.

Fig. 2 represents the combined screw and ratchet wrench, E, being the screw, and F the spring of the catch-bar, which in this case is connected with the movable sleeve. The jaw may be adjusted by the screw, E, and then held by the catch-bar, or it may be operated by the screw alone by raising the catch-bar.

Fig. 1

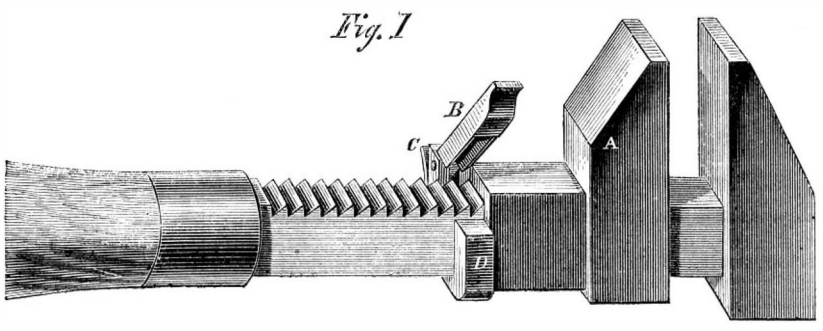
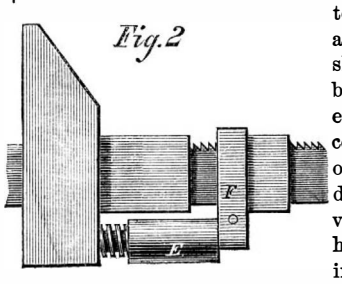


Fig. 2



CHRISTOPHER'S IMPROVED WRENCH.

Letters patent were issued for this invention through the Scientific American Patent Agency, Aug. 27, 1867, to Theodore D. Christopher, who may be addressed at Madison, Ind. The patentee desires to arrange for the manufacture of his wrench on a royalty.

A DEEP COAL MINE, WITH A DESCRIPTION OF ITS PUMPS, WINDING ENGINE, ETC.

A very correct idea may be obtained of the deep English coal mines from the following extracts from a paper read by Mr. Higginbotton before the Manchester Geological Society, on the Astley Deep Pit, said to be the deepest coal mine in England.

The new pit, which has been sunk to the Black Mine on the Dunkenfield estate, near Manchester, is no less than 686½ yards deep from the surface of the ground. The usual diameter of this pit is 12 feet, with the exception of a short distance in the middle of its length, where it is widened to 12 feet and 6 inches to facilitate the passing of the chairs, and also excepting a short distance of the bottom of the pit, where it is gradually increased to 19 feet 20 inches. 320,931 cubic feet of materials have been taken out in sinking this pit, and 10,584 cubic feet in addition for mouthings. Out of the total depth of the pit 211 yards have been sunk through rock; 443½ feet through shale; and the remaining 32 through seam coal.

With respect to the coal seams, there are 26 of more than one foot in thickness, of which 15, with an aggregate thickness of 58½ feet, have been worked at different places in the neighborhood and may, therefore, be considered to have a present commercial value. The shaft with the exception of 42 yards where it is tubed with cast-iron segments, is walled with a nine-inch wall of arch bricks, stiffened at intervals by stone wings, 18 inches thick, of which there are 80. Altogether, 7,308 cubic feet of stone, and 750,000 bricks have been used in the shaft exclusive of those employed in the mouthings, etc.

In sinking, water was met at the following depths: At 481 yards from the surface 40 gallons per minute; at 240 yards, 35 gallons; at 358 yards, 52 gallons; at 413 yards, 33 gallons; at 590 yards, 5 gallons, making a total of 165 gallons per minute.

This water is raised to the surface by seven lifts of plunger pumps; of these, the four upper are 12 inches in diameter, and the three lower 9, 7, and 6 inches diameter; they have all a stroke of eight feet.

The four heavy lifts average above 90 yards in length each, and are arranged alternately on opposites of the pump rods; each stroke of the pump raises 39 gallons, and consequently the engine has to run at an average speed of four and a quarter strokes per minute for twenty-four hours. At full speed the engine would make from eight to nine strokes per minute. The pump trees are thirteen inches internal diameter, and are for the most part of wrought iron, the plates of which they are made to increase somewhat in strength toward the bottom of the lifts. The total weight of the pumping rods, joint plates, clamps, bolts, plunger poles, etc., is 85 tuns; of this weight, 40 tuns are balanced at the pit top, leaving 45 tuns to overcome the weight of the column of water and the friction of the plunger poles, etc. The pumping apparatus occupies in the pit an area of twenty-nine square feet, leaving eighty-four square feet for winding.

The conducting rods are of pitch pine, attached to beams of the same wood, which are supported on cast-iron boxes set into the walling of the pit.

The horse trees are also for the most part of pitch pine, as are the pump rods, which are fifteen inches square at the top and diminish gradually downward to ten inches. The total amount of timber used in the pit is 5,882 feet.

The pumps are worked by a side lever Cornish engine, with a seventy inch cylinder eight feet stroke. The steam is supplied by three boilers, thirty-four feet long six feet 6 inches in diameter, with an ordinary working pressure of twelve lbs. to the square inch. The winding-engine cylinder is sixty inches diameter by seven feet stroke. The winding drums are twenty four feet two and a half inches in diameter, and the whole weight of crank, crank axle, and drums, is fifty-three tuns.

To one of the winding drums a brake drum is attached which is acted on by a steam brake of great power. Beside the winding drums, there is on the main shaft a balance weight drum 6 ft. 8 in. in diameter, to which is attached a balance weight of 5 tuns. The engine is capable of making 25 strokes per minute, thus raising the load in the pit about 21 miles an hour. Allowing for the time lost in hooking on and taking off, the engine is able to raise 600 tun of coal in 10 hours.

The winding ropes are of wire 4½ inches broad by 1⅛ inches thick at the top tapering down to 3¼ inches broad by ⅝ inch thick. They weigh 4½ tuns each, and the breaking strain at the thin end is 30 tuns; the actual working load is 3¼ tuns, which is made up as follows: The chair, which is constructed to carry four double tubs, weighs 16 cwt., four tubs which weigh 17 cwt., and the coal weighing 32 cwt., making in all 65 cwt. The winding ropes pass over pulleys 15 feet in diameter, which are supported by the head gear at a hight of 50 feet above the landing stage. Besides the engines described, which were erected by Messrs. Fairbrain of Manchester, there is on the ground a high-pressure capstan engine of 30-horse power by Messrs. Garforth, of Dunkenfield. There are now eleven boilers actually in use, and room in the boiler house for two more.

There are seven lifts in the pit, all being rams, the largest lift being 158 yards. There is also a small low-pressure engine which drives a circular saw and drilling and punching machines, and supplies generally the power required in the workshops. The workings are aired by the assistance of a dumb drift, which is driven up from a counter level to No. 2 shaft, rising two feet to the yard. The dumb drift is ten feet diameter, which forms an area of 78½ square feet, and enters the upcast shaft at 600 yards from the surface; the furnace drift is 25 yards from the pit bottom, being 61½ yards below the dumb drift.

Careful observations made during the sinking of the pit have shown that the temperature of the strata, increases with tolerable regularity from 57° at a depth of six yards to 75¼° at a depth of 686½ yards. The temperature on the pit top, May 28, 1867, at 11 A. M., was 58°; at the pit bottom 64°; variation 6°: in the return air roads, when the air passes round the workings, and has done all its work previous to making its exit into the dumb drift, is 71°; variation from pit bottom 7°. There is now an incline at work at the bottom of the Astley pit, which is 250 yards down, lying at an angle of one foot to the yard, making the total perpendicular depth from the surface to the lowest point 770 yards.

FAIR OF THE AMERICAN INSTITUTE.

This exhibition, which is of a national character, has entered upon its second week, and is now in a presentable shape. We had hoped that before the issue of this present number of our paper we could have begun a report of the exhibition, taking the departments and their individual divisions *seriatim*. This has, however, been rendered impossible from the great extent and comprehensiveness of the exhibition, and from the fact that in one of the prominent departments—that of machinery—the power for its propulsion has been inadequate. This trouble will, however, be immediately remedied. Additional steam boilers are being daily added, and before our next issue the machinery department will be a hive of humming industry.

We might, even now, make some notice of particular portions of the exhibition, but we wait until we can give a view which shall not only be agreeable to our readers, but just to the exhibitors. In the meantime we advise all who can, to make a visit to this exposition of art and industry, and they will not fail to be greatly interested and benefited. One of the novelties which will attract attention is the pneumatic tube, in actual operation, by which passengers are shot through space as is a cannon ball; and another the letter delivery tube, by which letters and parcels are sent almost instantly from one point to another.

Music every evening and the brilliancy of the gas lights make the scene one of unusual beauty. The pictures and statuettes in the art department are seen to as good advantage in the evening as during the day, and the machinery performs its evolutions as satisfactorily. This is the period which seems to be the favorite one with the mass of visitors.

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VOL. XVII., No. 14.....[NEW SERIES.].....*Twenty-first Year.*

NEW YORK, SATURDAY, OCTOBER 5, 1867.

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MECHANICAL POSSIBILITIES AND IMPOSSIBILITIES.

Our readers are aware that we have latterly—after having, time and again, discussed such subjects—refused to occupy our columns with conjectures on such mechanical improbabilities as perpetual motion *et id omne genus*. This course has subjected us frequently to adverse criticism and indignant protests from those who believe their own theories rather than well-established facts and natural laws. We have now before us two well written letters which charge us with proscription and old fogyism, pursuing a dog-in-the-manger policy, etc., because we refuse to ventilate ideas which even a superficial knowledge of natural laws would show to be erroneous. It is our interest as well as our intent to note, discuss, and, so far as may be, encourage all well-directed attempts at new discoveries and improvements; but it is no less our duty to refuse to promulgate error.

That progress has been made in a direction which from our ignorance of natural laws seemed to have been closed is undeniable, but that progress was rendered possible only by the necessary addition to our knowledge of those laws. Again, the capabilities of mechanism have been underrated and this has compelled such men as Dr. Lardner to deny the possibility of crossing the Atlantic by steam, and to ridicule other attempts which have proved successful. These mistakes and misjudgments are simply consequences of our ignorance of powers we had no adequate means of estimating.

But when an attempt is made to nullify and render inoperative the plainest and best established laws of mechanics, it would ill become those who profess to make those laws their study to encourage efforts which can end only in failure. There are certain laws which not only regulate and direct, but govern the action of bodies. The attempt to abrogate the laws governing gravitation, inertia, friction, resistance of media, etc., must necessarily prove futile. Some of their effects may be neutralized or modified by bringing other forces into action, but inventions which depend for success on overcoming the action of natural mechanical laws are useless and the time spent on them is wasted.

As our knowledge of these laws is extended and our conception of their relations developed undoubtedly many attempts now unsuccessful may become accomplished facts. Aerial navigation, now apparently impossible, may be in the future *un fait accompli*. There appears to be nothing thoroughly hostile to its accomplishment in natural laws; we lack only the proper apparatus for sustaining, propelling, and guiding a ponderable mass in and through the ærial ocean.

That a motive power may be discovered much cheaper, less cumbersome and dangerous, and still as capable of use under all circumstances as the steam engine is not impossible. Nothing in nature's laws would seem to contravene this result, but as yet we have failed even to approach it. All efforts toward these or other ends which are conducted in accordance with well-known laws, and all efforts to further ascertain the relations of those laws are legitimate subjects for endeavor and encouragement; but misguided attempts to contravene the plain laws of nature ought not to be sustained by those who really desire the well being and advancement of their race.

ARE OUR FEET PROPERLY CLOTHED?

It is somewhat surprising that, with all our boasted improvements, we have not as yet produced a proper covering for the feet. Barbarous people, if their climate admits, go with bare feet, or wear sandals covering only the sole, or slippers with just enough of upper to retain the sole on the feet. We, however, encase the whole foot, and a portion of the leg, in a material almost impervious to air and moisture, and generally uncomfortably hard and rigid. The color and polish of our boots are directly calculated to attract the sun's rays; and the enamel on patent leather, and the blacking on ordinary calf skin, tends to harden and solidify the substance, closing the pores and making air-tight cases for a portion of the body, which exudes more perspiration than any other, and is subjected to greater strain.

Our boots in summer parboil our feet in a warm bath, and in winter freeze them in an icy envelope. It is doubtful if wet feet are, in themselves, very conducive to disease, some medical men to the contrary notwithstanding; but cramped confinement of the feet, in an icy cold envelope, generated by perspiration and chilled by the external atmosphere, thus shutting the prisoned feet up almost air-tight, is as unhealthy as it is uncomfortable.

For hot weather there is hardly any shoe so agreeable as that introduced within the past three or four years, known as the army shoe, and extensively used by base-ball players. It is of heavy canvas and unblacked leather. It is cool and remarkably easy to the feet. The texture of the canvas allows the escape of the perspiration, and the color of the shoe does not attract the heat of the sun.

It would seem that the plan of covering other portions of our bodies with material pervious to air might advantageously be extended to our feet. There is no natural reason why our feet should be so much less sensitive than our hands. They become indurated and deprived of their natural activity by long, close confinement. The people of warm climates, who use their toes as we do our fingers, and the bare-footed school-boy, who picks up and throws pebbles with his feet, show that the foot of the civilized adult in our climate is a much abused member.

A more flexible and porous material for our boots and shoes might save us from many of those terrible annoyances, which, in the form of corns and bunions, make our pilgrimage one of pain.

THE SWEDISH COAST DEFENSE MONITORS.---A NOVEL CRAFT.

It will not require much thought for any one to see that for a nation with the resources and requirements of Sweden to expend its means in constructing huge, deep-draft and unwieldy iron-clads like the *Warrior*, *Bellerophon*, or *Magenta*, would be to fritter away its energies without adding materially to its means of defense.

The first and, indeed, the only essential wants in the naval line of a country situated like Sweden, are the means of defense from invasion—the means, in other words, of maintaining its independence. When this want has been supplied it will be time to expend money in building naval yachts and broadside iron-clads.

In solving a problem of this character, the first thing indicated is to put the most powerful guns attainable afloat in vessels of small size and light draft, so that they can be maneuvered with ease and safety among the numerous islands and inlets which characterize the peculiar coast of that country. Accordingly, such has been the ideal of Capt. Ericsson in designing the Swedish 15-inch monitor gunboats.

Those of the readers of the SCIENTIFIC AMERICAN versed in naval architecture will, without doubt, agree with us that an iron-clad of only 140 tuns burthen, mounting a 20-tun 15-inch gun, and carrying ammunitions and stores is neither more nor less than a floating gun carriage. Hence a steam motor applied to such an iron-clad must not only be of small power, but must also be an auxiliary for special occasions.

In view of this, as well also as the fact that, in time of war, Sweden cannot depend on a supply of coal, Captain Ericsson has adopted the novel expedient of fitting these pocket monitors with an arrangement whereby the steam engine may be disconnected from the propeller shaft so that the propeller can be turned by manual power.

The hull of these monitors is made of iron and is 85 feet in length, 18 feet wide, and 7 feet deep; the deck as well as the sides of this hull is composed of iron; or, in other words, it is a complete water-tight box. On top of this hull so constructed, a deck of thick solid timber, which, in fact, may be called a raft, is attached without the use of the objectionable through bolts. This deck or raft is 103 feet in length, 20 feet wide, and 2 feet deep, and it is pointed at both ends. The forward end is protected by five inches of solid iron. As will have been perceived by the description, this deck projects some nine feet at each end over the iron hull; this projection at the bow, besides protecting the anchors, as in the *Passaic* class of monitors, is also fitted with a small feathering wheel paddle, the use of which is to trim the gun, the turret being stationary. Of course, as the turret is stationary, these small monitors are intended to fight bow on and to expose the least possible area to the enemy's fire. The turret is oval in form, and is twelve feet wide by nineteen feet long in the direction of the length of the boat. As the turrets are stationary it is not necessary that the pilot house should be placed in the center; accordingly it is placed at the after end of the turret, which position not only allows ample space for hatchways but also places the steersman and commander directly in the rear of the 15-inch gun, and hence he can, by means of the aiming wheel and also with the assistance of the balanced rudder, if the propeller is in operation, aim the enormous weapon accurately, and give the order to fire, or, if need be, pull the lock string himself. The port is quite wide enough to admit the muzzle of the gun and high enough to allow for 10° elevation. It will be closed by a huge wrought-iron port closer, the same as those used in our monitors.

The most marked features in this Liliputian iron-clad are, we think, the aiming wheel and the mechanism for applying the power of the men to the propulsion of the vessel.

The aiming wheel is placed in an opening four feet, three and a-half inches square, cut in the forward projection. The shaft of this wheel is parallel with the keel, and it is a few inches above the water line. It is clear that by turning this wheel the bow of the vessel will be moved sideways. The resistance which it will offer to the motion of the vessel forward will amount to nothing, as the wheel is made without rims and the buckets are of plate iron only a quarter of an inch thick. As the wheel cavity will be sometimes filled with water, the paddles at the upper part of the circumference would counteract those below were it not that the wheel is fitted with an eccentric feathering movement which keeps the upper paddles horizontal while the lower ones are vertical. This wheel is rotated by men within the vessel by means of winches conveniently placed. This novel instrument has not been adopted without careful experiment.

A full-sized aiming wheel was applied to a raft the same as the raft which forms the deck of the gunboat, and fitted up precisely as it will be in practice, and was operated by the same number of men as will be when devoted to that duty. The efficiency of the apparatus was tested both by the side motion of the raft and also by lifting weights attached to a line which passed over a pulley and was made fast to the raft. The training power was found to be in excess of the force necessary to quickly aim the gun.

With respect to the man-propelling mechanism, we witnessed a trial with it last week at the Delamater Iron Works, Messrs. Mulford & Ripley. We found in the erecting shop at these works the steam machinery of one of these gunboats, erected complete and attached to the propeller shaft, to which a friction brake was attached. This steam machinery was very compact, neat, and elegant in design, beautifully finished, and above all, devoid of anything in the way of "gimcracks." It has the capacity to develop about 40 indicated horse power.

The man-power mechanism is arranged as follows; On each side of the center line of the vessel, and forward of the engines, a row of seats, running transversely, each large enough to accommodate two men, are placed. It is arranged for 30 men.

On each side of the center, between each seat, is placed a vertical lever, pivoted at the lower end; at the upper end an eye is formed through which passes a hickory handle or brake —each vertical lever is therefore pulled by two men. These vertical levers are connected together at their upper ends by light iron rods, and also to cranks (placed opposite to each other) on a transverse shaft, which is attached to the propeller shaft by conical gearing. Thus one half the men pull at a time. The brakes were manned by a party of splendid-looking Scandanavian sailors from the Swedish corvette *Norrkoping* (which is to carry the whole of this new machinery to Stockholm). It was found by the friction brake that they could run off seven and a half net horse-power, and that they could maintain five and a half for many hours. The force is amply sufficient for the purpose intended, which is not for making a long voyage, but for maneuvering in positions which they may be assigned to defend, and as the boats carry sixty days' stores, it will be readily seen that they can maintain their position for that time. The gunboats carry coal for one hundred hours steaming, or sufficient to propel them five hundred nautical miles.

Captain Ericsson has constructed the whole of this machinery at his own cost and presented it to his native country as a pattern to be strictly followed in the building of its defensive fleet of 15-inch monitor gunboats.

THE PARIS SAFE TRIAL. A FARCE.

Since our publication of the report of the safe trial between Herring and Chatwood, copied from *Engineering*, we have received several communications evidently intended to show—what is not apparent by the trial—the great superiority of the American safe over its English rival. Perhaps this superiority was established at the trial, or if not, possibly it can be so established, and nobody would rejoice more than we at such a triumph of American mechanical skill; but the various reports do not seem to differ in any essential particular from the facts reported in *Engineering*. On the Chatwood safe were used a heavy sledge, slung by brawny arms, large wedges, and crowbars, and on the Herring safe the hand hammers, serrated wedges, and jointed levers of the burglar. The sledge hammer was used on the Herring safe only in opening his internal box in which was placed the block, the object sought, which in Chatwood's safe was contained in the outer case only.

Yet we cannot see what bearing this trial has, after all, on the relative value of either of these safes as offering resistance to the attempts of burglars. Burglars do not come with sledge hammers, and bang and rap away for two or three hours to reduce a structure of mechanical proportions to a mass of old junk. The whole trial was a farce—nothing less—and it was the hight of folly in the commission under whose auspices the experiments were conducted that they did not define the nature of the implements to be used, only allowing each competitor to furnish as expert an operator as he could find.

A test conducted by scientific burglars with the ingenious implements ordinarily used by them, would have been an interesting exhibition, and the result would have been of practical importance to the business community.

As an advertising dodge, which, probably, both exhibitors intended, it may answer their purpose, but the practical result deducible from the trial is not apparent.

The nonsense of allowing three men to bang, and chisel, and hammer for hours to open a safe, is too ridiculous to merit serious consideration.

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RETURN OF COMMISSIONER WELLS.

Hon. David A. Wells, U. S. Commissioner of Revenues, who sailed for Europe last May on business connected with the Revenue Department, returned on the 16th Sept. in the *City of London.*

Mr. Wells was cordially received by the large manufacturers in England and on the Continent, and has returned with valuable information pertaining to foreign manufacturers and industries, which will be laid before Congress at its next session.

It is seldom that Congress exhibits as much wisdom in selecting officers for special service as it did in choosing Mr. Wells for his commission. Mr. Wells is not a politician, but an intelligent, practical, industrious gentleman, educated to scientific pursuits, author of several standard school and other books, and as a statistician, has few equals, as his last report to Congress, through the Secretary of the Treasury evinces. His next report will be looked for with greater interest than his first, containing, as it probably will, many practical suggestions as to changes in the tariff.

Amusing Typographical Blunders.

The *Evening Gazette* of this city, one of the best edited papers published in the country, and for correctness of its statements and typographical neatness excels most of its older cotemporaries, thus apologizes for one of its compositor's amusing blunders:

"A 'bewildered reader' wants to know what Sala means by saying that the French call the English "a nation of grasshoppers." To tell the truth, our compositor did Sala a great injustice. We wrote—what everybody is familiar with—"a nation of shop-keepers;" but the printer preferred the word grasshoppers and the proof-reader agreed with him. In fact, the misprint in question was one of the most amusing in the history of typographical errors."

Justifying Type by Machinery.

Mr. Charles W. Felt, of Salem, Mass., has been engaged for several years upon a composing machine that shall not only compose and distribute type, but also justify the matter. He has recently exhibited, in this city, a little justifying machine about fourteen inches long, which can be adapted to any of the other type-composing machines quite as well as Mr. Felt's. He purposes to commence manufacturing these justifying machines and attaching them to such composing machines as are in use, and at some future time will introduce his own composing machine for competition with the others.

THE MECHANICS' FAIR at Lowell, Mass., began on Tuesday, and will continue one month probably. There are one thousand three hundred exhibitors, and the articles on view are very numerous. The halls thrown open cover nearly an acre of ground.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING SEPTEMBER 17, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

68,829.—PORTABLE HORSE-POWER.—Hiram Aldridge, Goshen, Ind.

1st, I claim the movable hounds or braces, O P, applied to the front and rear ends of a portable horse-power in such manner as to secure these ends down to the ground upon their wheels, substantially as described.

2d, The combination of diagonal braces or ties, R R, with the inclined braces, O P, and a portable horse-power which is mounted upon four wheels, substantially as described.

3d, Locking devices applied to the transporting wheels of a four-wheel horse-power, substantially as and for the purposes described.

4th, Locking devices applied to the front axle of a four-wheel portable horse-power, substantially as described.

5th, The construction of the cast-iron ring, E, for the purposes and substantially as described.

6th, The arrangement of the coupling shaft, J, or its equivalent, so as to admit of the attachment of tumbling shafts to both ends of it, substantially as described.

7th, The auxiliary removable, supporting frame, S, applied to the portable horse-power frame, substantially in the manner and for the purpose described.

8th, Combining sweep or lever horse-powers with a permanent four-wheel carriage for transporting the same and which is arranged with means that will admit of the locking of its wheels and the securing of the machine down upon the ground upon its wheels for operation, substantially as described.

9th, The permanent hound or braces, O P, applied to the front axle of a portable horse-power in such manner as to prevent said axle from moving right or left on its wheels when said power is operated, substantially as described,

10th, The diagonal braces or ties, R R, applied to a portable horse-power which is mounted upon and adapted for being operated upon four wheels, substantially as described.

68,830.—LIQUID METERS.—Richard H. Atwell, Baltimore, Md.

1st, I claim the valve, K, constructed and operating in combination with the wheels, D, substantially as described for the purpose set forth.

2d, The helix, H, in combination with the shaft, C, water wheels, D, and registering device, substantially as and for the purpose specified.

3d, The arrangement of the rims or partitions, a a', water wheels, D, and valve, K, substantially as described.

68,831.—REEL.—F. A. Balch, Hingham, Wis.

1st, I claim the parallel bars, C D, to connect the head, B, and winding blade, E, of a reel, substantially as and for the purpose set forth.

2d, The head, B, and blade, E, connected by the parallel bars, C and D substantially as set forth in combination with the sliding head, F, and connecting rods, G, for the purpose of retaining the winding blades more or less distended as desired.

68,832.—MACHINE FOR DRESSING WEAVERS' HARNESS.—A. E. Bigelow, Lawrence, Mass., assignor to John and J. H. Kendrick, Providence, R. I.

1st, I claim the combination of an endless tenter-hook belt, C C', with the revolving brushes, F F, substantially as described for the purposes specified.

2d, The combination in one machine of the endless tenter-hook belts, C C', or equivalent means for supporting and conveying the harnesses an apparatus for sizing and an apparatus for varnishing a weaver's harness, substantially as described for the purposes specified.

3d. The reciprocating brushes, k k', when arranged to act upon the harness, in the manner and by the means substantially as described.

4th, The combination of the endless tenter-hook belts with the reciprocating brushes, k k', substantially as described.

68,833.—CANAL LOCK.—Martin Bishop, Putnam, Ohio.

1st, I claim the construction of the gate operating on its shaft, L, with its arms, M, fitting between the divisions, N, and having bracing, P P, and resting below the bottom of the canal in the correspondingly shaped chamber, R, as herein described and for the purpose set forth.

2d, I also claim the chamber, R, constructed as described with subdivisions, N N, located beneath the bottom of the canal, as herein described and for the purpose set forth.

3d, I also claim, in combination with such chamber and gate, the adjustable wickets, operated as described and for the purpose set forth.

4th, I also claim, in combination with the gate, the movable device or apparatus, S, as herein described and for the purpose set forth.

68,834.—PRESERVING EGGS.—L. H. Boole, New York City.

1st, I claim the process of preserving eggs by desiccation and compression substantially as herein described.

2d, As an article of manufacture eggs desiccated without heat, substantially as described.

3d, As an article of manufacture eggs desiccated and compressed, substantially as herein described.

68,835.—SEWING MACHINE.—C. F. Bosworth, Milford, Conn.

1st, I claim the combination of the slot, I, in the one plate and the slot, H, in the other with a connecting rod, K, constructed with its two bearings, a and b, so as to operate substantially in the manner herein set forth.

2d, The arrangement of the positive take-up, Q, with its cam, S, formed relatively to the movement of the needle and in combination with the third eye, d' on the needle slide, so as to operate in the manner specified.

3d, The arrangement of the tongue, m, upon the shuttle carrier in the position relative to the return tongue, i, so as to operate as described.

68,836.—LADDER.—Margaret D. Boyd, Buffalo, N. Y.

I claim the employment of the sockets, B, for the reception of the ends of sections when so arranged that the bolt which fastens them and the sections together acts at the same time as a step or round for the ladder.

68,837.—LIFTING JACK.—A. C. Brincer, Middletown, Pa.

I claim the square reversible link, H, with its rope, J, when arranged and combined with the movable lever, E, and post, B, with its stationary pins or riveted bolts, C, as herein described and for the purposes set forth.

68,838.—TELEGRAPH APPARATUS.—J. M. Brown, Auburn, N. Y.

I claim the combination and arrangement of the electro magnets, B B, excited by the current of the main line with the electro magnets, A A, excited by a local current traversing the armature lever, D, contact point, E, and pillar, I, as and for the purpose set forth.

68,839.—SEWING MACHINE.—Lewis Budd Bruen (assignor to the Bruen Manufacturing Company), New York City.

1st, I claim the combination of eye-pointed needle, b, thread carrier, M, cam, C, beed bar, H, and rotating hook, L, operating together to form seams, as described.

2d, The combination of eye-pointed needle, b, thread carrier, M, cam, C, feed bar, H, rotating hook, L, and bobbin, Y, operating together to form seams, as described.

3d, Cam, C, pin, S, and thread carrier, M, acting in combination, substantially as and for the purposes explained.

4th, Cam, C, slide, , and thread carrier, M, acting in combination, substantially as and for the purposes explained.

5th, Spool guard, O, removable or permanent and with or without spool holder, P, and tension, N.

68,840.—PROCESS OF PRODUCING GAS FOR FUEL.—John H. Burgin (assignor to himself, George H. Burgin, Jr., Charles F. Burgin and William M. Burgin), Philadeldhia, Pa.

1st, I claim introducing steam into gas producing ovens in quantity sufficient to prevent the rapid combustion of the fuel although the fuel is exposed to a full supply of atmospheric air by maintaining the larger, to wit: the upper portion of the fuel at a dull cherry-red heat while the lower portion is kept in a state of incandescence, in the manner and for the purpose substantially as set forth.

2d, Introducing steam into gas-producing ovens above the grate bars or bottom thereof directly into the body of incandescent fuel in fine jets or in a continuous thin sheet or in several such sheets in quantity aforesaid and for the purpose aforesaid.

3d, Introducing steam into said ovens below the grate bars or bottom thereof through the body of incandescent fuel in the quantity and for the purpose aforesaid.

4th, Introducing steam into gas-producing ovens above the grate bars or bottom thereof directly into the body of incandescent fuel in quantity aforesaid in combination with an artificial blast of air below the body of fuel.

5th, I claim the employment of anthracite coal as a fuel in gas-producing ovens in combination with an artificial blast of air and with steam, the air and steam being admitted in quantity sufficient to maintain the lower portion of the fuel in a state of incandescence and the upper and larger portion of the fuel at or about a dull cherry-red heat, substantially as set forth.

6th, The pipe, H, constructed and arranged substantially as described for introducing steam into the oven.

7th, The pipe, H, constructed and arranged substantially as described in combination with the aperture, E, and pipe, F, or other device for producing an artificial blast of air, substantially as shown and described.

8th, The pipe, F, or other device for producing an artificial blast in combination with the pipe, H, and valve, K, in the exit flue of a gas-producing oven, substantially as shown and described.

68,841.—CORN PLANTER.—Robert and Joseph L. Cassady, Hardingsville, N. J.

1st, I claim the boxes, F F, hoppers, K K, bars, G G, cross piece, H, and arm, I, in combination with the ratchet wheel, d, and the levers, J K, or their equivalents, the whole being constructed and operating substantially as and for the purpose described.

2d, The frame, S, with its arms, t, and plates, w, hung to the frame, A, substantially as specified.

3d, The adjustable bars, P P, and their plates, f, in combination with the shaft, R, and its pinions, i, or their equivalents, the whole being arranged on the frame, substantially as and for the purpose set forth.

68,842.—TRUSS.—Robert H. Champlin, Colchester, Conn.

I claim the herein-described truss consisting of the band, A, straps, C C and E, and pad, D, all constructed and arranged as specified.

68,843.—SHIFTING RAIL FOR CARRIAGE TOPS.—Patrick G. Clancy, Augusta, Me.

I claim the arms, b b', having the gain, C, decreasing in width from its outer to its inner side, and having the short shoulder, x', and the rounded or beveled corner, s, substantially as and for the purposes specified.

2d, The wedge-shaped socket plates, a a', substantially as and for the purpose specified.

3d, The combination of the bent arms, b2 b2, with the notched arms, b b', substantially as and for the purpose specified.

68,844.—THILL COUPLING.—L. C. Clark, Davenport, Iowa.

I claim the thill iron, B, constructed as described, in combination with the clip, A, having the packing, a, arranged between the ears, A''', on the plate, A'', all arranged to operate as and for the purpose set forth.

68,845.—SNOW PLOW FOR RAILROADS.—Henry H. Clemons, Oshkosh, Wis.

I claim a snow plow for railroads, composed of an inclined platform, A, a plow, B, and the cutters, C, constructed, arranged, and operating, substantially as herein set forth and described.

68,846.—HARNESS BUCKLE.—W. H. Cocks, Richmond, Ind.

I claim the loop or slide, C, spring, P, and one or both of the pins, d and e, in combination with the strap, A and B, all arranged and operated substantially as set forth, and for the purpose described.

68,847.—WATER ELEVATOR.—Pearce K. Curll, Elkridge Landing, Md.

I claim a water elevator, consisting of a series of buckets, E, having journals attached as described, and connected by the detachable links, l, with the flanged rollers, n, applied to the journals, the whole mounted in a suitable frame, having tracks, A and B, for guiding and supporting the series of buckets, all constructed and arranged to operate substantially as described.

68,848.—CULTIVATOR.—Elliott Davies, Jr., Carthage, Ill.

1st, I claim the lever, S, in combination with the sliding cross head, M, mounted on side pieces, C C, and bearing pieces, O O, connected by stay rods, P P, to main axle, A, and bearing the two inside plows, R R', all substantially as specified.

2d, The stationary back plows, F F, connected to the cross piece, D, in combination with the side pieces, C C', the sliding cross head, M, with its plows, R R', the wheels, B B', seat, K, and the tongue, H, hinged to ends of pieces, C C', all substantially as specified.

68,849.—STEAM GAGE.—George M. Davis, Chicago, Ill.

I claim the diaphragm, A, arranged to support the devices, D B C H, and having rims, P P, for clamping plate, N, to projection, M M, on back, K, substantially as and for the purposes set forth.

68,850.—MODE OF PRESERVING MEATS, ETC.—E. de la Granja (assignor to himself and Herman Susmann), Boston, Mass.

I claim the process of preserving meats, by applying the injection or saturating mixture above described, in combination with the impermeable covering, substantially as and for the purpose set forth.

68,851.—WASHING MACHINE.—A. Denison, Stillwater, N. Y.

I claim the revolving box, B, constructed of wooden bars or slabs, h, and end pieces, D, in the form of a polygonal prism, with a hinged section extending its entire length, and having journals attached to it as described, in combination with the journals, E E', journal boxes, F F', and balls, l, open tank, A, when arranged to operate in the manner and for the purpose specified.

68,852.—PUMP PISTON.—Wm. E. Derrick (assignor to himself and Aaron Peck), Jordan, N. Y.

I claim the pump piston, having two sets of induction and eduction ports, E and F and a valve, G, with two flat wings, connected together by a shank which is held in position by the solid pivot, a, upon the lower half, D, of the piston head, all the parts being constructed and arranged in the manner shown and described, and for the purposes set forth.

68,853.—STEAM ENGINE.—E. N. Dickenson, N. Y. city.

1st, I claim the combination of the two lifters, on the same lifting rod, one being fixed to it, and the other sliding upon it, for the purpose of effecting the reduction of the initial motion of opening steam valves, substantially as described.

2d, I claim the combination of the lever for opening the steam valve gradually, with the fixed and movable lifters, the one being moved by the motion of the lifting rod, and the other supporting a separate disengaging apparatus, substantially as described.

3d, I claim a lever, one end of which is raised by the fixed lifter or the lifting rod, and by which the steam valve is pried open gradually, so arranged that it can be adjusted to vary the speed of lifting, without changing the position of the point on the lifter, relatively to the valve stem, to which the lifting power is applied, substantially as described.

4th, I claim the vibrating tripper, centered upon the lifter itself, which opens the valve, as distinguished from a tripper which is centered, or some other part of the machine, substantially as described.

5th, I claim the vibrating die for engaging and disengaging the valve stem to effect a cut-off, so arranged that it will vibrate in an arc whose concave side is presented to the valve stem, substantially as described.

6th, I claim the collar which surrounds the valve stem, having one or more radial ribs upon it, for the purpose of cooperating with a movable die to effect a cut-off, substantially as described.

7th, I claim a "dash pot," whose plunger is composed of two cylinders of unequal diameters, the smaller of which is the arresting plunger, forming the bottom of the larger one, and whose exterior chamber is composed of a cup or secondary reservoir, to receive the arresting plunger, and above it a confining vessel to guide the larger cylinder of the plunger, and to exclude the air, substantially as described.

8th, I claim the combination in a rock shaft of one false exhaust toe, and one fixed one by which it is supported, with a stud or prop between them, so arranged that it can be dropped or elevated at pleasure, substantially as described.

68,854.—GRINDING AND POLISHING METALS.—Menno Albertus Diedrichs, and Johann Henricus Diedrichs, Baltimore, Md.

1st, The sliding frame, m, in combination with flanges or tracks, N N1 N2, adjustable strip, N3, set screw, N4, when constructed and operating in the manner and for the purpose set forth.

2d, The pivoted frame, J, in combination with the weighted lever, L, slotted cross piece, V, dogs, W W', curved notched arm, Y, and spring plate, c, constructed and operating as and for the purpose set forth.

3d, The adjustable stop pins, f, heads, f, and rib, M', in combination with the lever, S, and pivoted frame, J, constructed and operating as and for the purpose set forth.

4th, The lever, L, provided with hook, b, in combination with the hinged dogs, W W', arm, Z Z', and chain, a, constructed and operating as and for the purpose specified.

5th, The frame, O, provided with arms, O' O', in combination with the slotted adjustable bed plate, i, and bolts, i i', constructed and operating as and for the purpose set forth.

6th, The combination of the adjustable racks, g g', having set screws, g2, screw shaft, l, pinion, o, pawl, n, fixed ratchet, m, upright arm, j, pivoted box, k, and pivoted frame, O, substantially as described, for the purpose specified.

68,855.—HAY LOADER.—Martin A. Dilly, Mendon, Mich.

1st, The arrangement and combination of the hinged tilting bars, A a B b, and guide rod, I, with the hay fork, and with its lifting bar, L, automatic stop, k, and derrick frame, substantially in the manner described.

2d, Connecting the fork lines, t, to the head bar, J, by threaded bifurcated ends, e, short clamps, c, and nuts, n, substantially as set forth.

3d, The driver's seat, W, placed over the driving wheel, the axle of which carries a winding drum, N, in combination with an oscillating foot treadle, V, connected and arranged so that the driver with his foot may control the ascent and descent of the fork in the manner substantially as herein specified.

4th, The guard points, P, in combination with the fork tines, t, substantially as and for the purpose herein described.

68,856.—BARREL HEAD MACHINE.—John B. Dougherty, Rochester, N. Y.

I claim, 1st, an automatic barrel head, turning machine, when the automatic movements or adjustments are produced by suitable cams, P C', and C'', and their necessary connecting rods, substantially as herein shown and described.

2d, In combination with the sliding or clamping shaft, Y, the feathered pinion, P'', spheral springs, J, collar, c''', lever, L', and cam, C', they being arranged and operating conjointly in the manner and for the purposes shown and described.

3d, The arrangement of the set screw, k, pivoted nut, n, and the lever, L, in connection with the clamping heads, M and N, substantially as shown and described, and for the purposes set forth.

68,857.—BURGLAR ALARM.—Charles A. Eaton, Minneapolis, Minn.

I claim, 1st, The combination of the perforated plate, e, with the cock, C, as and for the purpose specified.

2d, The combination of cock and trigger, C D, with block holder and slide, A B F, substantially as and for the purpose described.

68,858.—THREAD POINTER.—Elijah Eaton, Hartford, Ct.

I claim a thread pointer, consisting of the hinged plates, A and D, the ends of which are provided with projections, B F, the faces of which are corrugated, serrated, or provided with a file surface, substantially as and for the purpose specified.

68,859.—COTTON BALE TIE.—N. T. Edson, New Orleans, La.

I claim so constructing and providing with sharp projecting points the bar, A, that it will grasp and hold the hoop, substantially as and for the purposes specified.

Also, so constructing and providing with sharp projecting points the bars, B, substantially as and for the purposes specified.

68,860.—APPARATUS FOR DISTILLING, EVAPORATING, AND REFINING OILS AND OTHER LIQUIDS.—John Ellis, New York city, and E. C. Kattell, Binghamton, N. Y.

We claim, 1st, The above described process for desiccating or evaporating saccharine saline alkaline, or other aqueous solutions by the use of superheated steam, as described.

2d, The construction of a retort, or a part of a retort, of a pipe or pipes, so arranged that when either steam or superheated steam and oil, or other liquids are passed or forced through it or them in the same or in opposite directions, the fluid will, naturally, from its superior gravity repeatedly pass through the current of steam, thus thoroughly mixing it with the steam in a comparatively confined space, heating it uniformly and vaporizing it, as occurs in the tubular portion of our apparatus, and as will result if a spiral pipe is placed in a horizontal position, or approaching that position, and steam and oil passed through it.

3d, The forcing or driving of petroleum, or other liquids, by the use of steam or superheated steam, applied directly to the liquid, either in a pipe or a retort upward, either vertically or at any inclination, or in any direction, upwards, in such a manner that the same oil or fluid will not return to pass through the same part of the pipe or retort again, until it leaves the retort.

4th, The constructing of a retort, or a part of a retort, either of a single pipe or of pipes, so bent or connected by return bends that portions lie parallel, or nearly so, with each other, as shown in the drawings and described in the specifications.

5th, A horizontal flat-bottomed chamber, connecting with a vertical chamber, and receiving the lower end of a pipe from a tubular retort.

6th, So constructing a retort, where either steam or superheated steam is to be used in direct contact with the oil or other fluids, that there shall be no chance for water from condensed steam to collect in the retort, owing to the escape pipe for the unvaporized portion of the oil or fluid being either on a level or lower, better lower than the lowest part of the retort, which is so far free from pressure as not to be forcibly cleared by the current of steam or vapor.

7th, The forcing of oil through a raise into a retort, into contact with a current of superheated steam.

8th, The water pipe, K, passing back and forth, in combination with a horizontal condensor, substantially as represented in the drawings.

68,861.—TANNERY.—Lewis C. England, Philadelphia, Pa.

1st, I claim hanging bars, 1B, with center and end lugs constructed and operating in the manner herein set forth and described.

2d, The arrangement of conveying off the weak or spent liquors from the tan vats either by a hollow beam, H B, with openings, 1' 2' 3' 4' 5' 6', placed near the top and running through the center or on the side of the vats or any other arrangement substantially the same to accomplish the desired purpose.

3d, Troughs, T T' and T'', supply tubes, S T, perforated distributing tubes, D T, tube, R T, junk No. 1, with pump junk No. 2, and connecting tube, C T, all constructed and combined in the manner and for the purpose above set forth and described.

4th, A tannery constructed and arranged in the manner herein described.

68,862.—BRICK MOLD.—John Evans, Davenport, Iowa.

I claim a brick mold having sliding bottoms, A, and side bars, B, the movements of which are regulated by guides, C, and grooves, D, substantially as described.

68,863.—HYDRAULIC ENGINE.—Mahlon Everett, (assignor to himself and Henry F. Cock,) Kalamazoo, Mich.

I claim the valves, P and P', the valve arms, L L, and the arms, H1 H2 H3 H4, in combination with the arm rods, G G, and piston rod, M, all arranged and operated as and for the purposes herein set forth.

68,864.—TRACE BUCKLE.—Oscar Finch, Owego, N. Y.

I claim a trace buckle, with a curved lever pressing the trace outward against two cross bars, thereby preventing the trace from tearing or breaking, and preventing injury to the horse as set forth.

68,865.—BALANCING MILL STONES.—John Foley, Cleveland, Ohio.

I claim the employment of the solid and chambered weights, c g, with their respective devices for adjusted them applied externally to the loop, F, the whole arranged and operating in the manner and for the purpose described.

68,866.—HAME FASTENER.—A. J. Foster, Lake Mills, Wis.

I claim in combination with the hames, A, the metallic strap or bar, B, provided with teeth or corrugations, b b, and the link, c, arranged and operating substantially as and for the purposes specified.

68.867.—COMPOUND FOR DESTROYING INSECTS.—Samuel Galbraith, Pine Grove Plantation, La.

I claim the composition above described, when compounded and used in the manner and for the purpose specified.

68,868.—WINDOW PULLEYS.—O. S. Garretson, Buffalo, N. Y.

I claim dividing the box or cap, C, into equal or nearly equal parts, by the segmental line, m, when the convex portions, b, form a part of the outer plate, g, and enclose the axle bearings, i, substantially as and for the purposes set forth.

68 869.—MALT KILNS.—Joseph Gecmen, Chicago, Ill.

1st, I claim constructing the perforated floors in separate sections, b, arranged and operating substantially in the manner and for the purposes set forth.

2d, I claim in combination with the series of floors in a malt kiln the arrangement of the space, R, provided with one or more openings, e f, substantially in the manner and for the purposes described.

68,870.—TOOL HOLDER FOR TURNING LATHES.—Samuel Gissinger, Lawrenceville, Pa.

I claim the pivoted leaf, B, when used in combination with the nuts, y, screws, c, armed with wheels, m, said wheels, screws and nuts being operated through the medium of the endless-screw, n, the whole being arranged combined and operating substantially in the manner and for the purpose herein described and set forth.

68,871.—DEVICE FOR HATCHING THE SPAWN OF FISHES.—Seth Green, Rochester, N. Y.

I claim the employment use of the fish propagator, or spawn hatcher, constructed and arranged substantially in the manner and for the purposes herein shown and described.

68,872.—SPINNING MACHINE.—J. Hart, S. Hart and J. Reesman, Farmington, Iowa.

1st, We claim the arrangement of the combined clutch and drum, r, for controlling the motion of the carriage with the spindle driving shaft and its pulleys.

2d, The tripping lever, T, cord, w', lever, P, latch pin, t, and spring rod, M, carrying arms, s s, in combination with a drum, r, which is provided with a clutching device, all being arranged and constructed in such manner that when the carriage presses against the lever, T, the drum, r, will be made loose upon its shaft and this carriage caused to stop further backward movement.

3d, The roping clamp, K, constructed of plates, l l, and an intermediate sliding plate, m, notched and perforated, substantially as described.

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4th. Providing for unwinding the roping from its spool, G, during a portion of the backward movement of the carriage, E, by means of a friction roller, F, and vertically and end wise movable bars, J J, which latter are actuated by the arms, J', on the carriage, substantially as described.

68,873.—HORSE HAY FORK.—Levi Haverstick, Mannor Township, Pa.

I claim the arrangement of the hoisting arm, A, with its eye, a, pulley, L, with or without the spur tooth, B, together with the elbowed latch, C D, and notched chck, F, in combination with the tine or tines, G, and ratcheted terminous and eye, g, held together by rivets, and operated substantially in the manner and for the purpose specified.

68,874.—ELEVATING BLOCK.—Wm. H. Hawley, Utica, N. Y.

1st, I claim the arrangement of the pulleys. B and B and D, in the same plane, with the two first above the other, substantially as described.

2d, The mode substantially as herein described of governing the motion of the apparatus and the draft robe by means of the stops, C and F.

3d, The track rope pulleys, B and B', and the stop, C, in combination substantially as described and for the uses and purposes mentioned.

4th, The draft rope stop, F, and pulley, D, in combination substantially as described and for the uses and purposes mentioned.

68,875.—CAR BRAKE AND STARTER.—Robert Heneage, Buffalo, N. Y.

1st, I claim the brake wheels, E E', in combination with the coiled spring, i, gearing, j k k' s, levers, H H. I I' and connecting bars, m m', arranged and operating substantially in the manner and for the purpose set forth.

2d, I also claim in combination therewith the spring, s g, arranged and operating substantially as specified.

3d, I also claim the standards, F, with their lower ends attached to and resting upon the axle, D, while their upper ends are held by guides, G, secured to the bottom of the car which slide up and down thereon with the springing of the latter, arranged and operating substantially in the manner and for the purpose set forth.

68,876.—HANGING GRINDSTONES.—David B. Herrinton, Detroit, Mich.

I claim the arrangement and combination of the plates, D D and C, and the set screws, C C and c, with the grindstone or pulley, A, and the shaft, B, or any other device, substantially the same, for the purpose designed.

68,877.—VEGETABLE SLICER AND GRATER.—T. G. Hofer, St. Louis, Mo.

I claim the outside conical cylinder, A, the revolving conical cylinder, E, the adjustable knives, p p' p'' p''', the movable rim, R, with its eccentric and regular slots, the grating cone, L, and the vise, V, all in combination, when constructed and arranged substantially as shown and described.

68,878.—CANT HOOKS.—Joel A. Howe, Bangor, Me.

I claim the lip, i, in combination with dog, d, substantially as set forth.

68,879.—STEAM ENGINE SLIDE VALVE.—Samuel W. Hudson, Beaver Meadow, Pa.

1st, I claim the wing, B', projecting from a slide valve to move it by the action of steam substantially as described.

2d, The arrangement of the steam passages, b b1 b2 b3, substantially as and for the purpose specified.

68,880.—CARRIAGE CURTAIN FASTENER.—Abel Hunt and Spencer Mero, Jr., Camden, Maine.

We claim the construction, arrangement and combination of the parts, B C D F G and H, as represented in the several figures on the drawing.

68,881.—SHOE SPIKE.—Robert Hutchison, Newark, N. J.

I claim a screw spike formed with a point, 2, a screw portion, 1, and a polygonal base, 3, for the reception of the key, f, in combination with the metallic socket secured to the sole of the boot or shoe as and for the purposes set forth.

68,882.—BRICK MACHINE.—George W. Ives, (assignor to himself and Alfred Ives,) North Haven, Conn.

I claim the arrangement of the lever, F, in combination with the lever, E, and crank or cam, C, so as to operate substantially in the manner herein set forth.

68,883.—CANT HOOK.—Edward Jewett, Rindge, N. H.

I claim the combination in a caut hook of the hook, B, and serrated plate D, constructed and operating substantially as and for the purpose set forth.

68,884.—BUILDING.—Job Johnson and Elijah D. Davis, Brooklyn, N. Y.

We claim the buttons or plates to secure the edges but allow the boards to expand or contract, in combination with a strip of metal or similar material secured to the edges and covering the joints substantially as set forth.

68,885.—MANUFACTURE OF MINERAL KNOBS.—Josiah Jones, Brooklyn, N. Y. assignor to Thomas Kennedy, Branford, Conn.

I claim the process herein described for the manufacture of mineral knobs.

68,886.—CLAMPING DEVICE.—Edwin King, Fredonia, N. Y.

I claim the improved clamp, A, provided with the return edges, D D, knife edge projection, F, slot, B, bolt-hole, C, and bolt, D', in combination with fence posts and trellis poles, so as to operate in the manner substantially as herein specified and for the purpose set forth.

68,887.—HAY RAKER AND LOADER.—N. S. Kinyon and B. F. Smith, Chenango Forks, N. Y.

We claim the inclined guide teeth, L L, and the wire guards, R R, in combination with the rake and elevating teeth and the endless carrier all being constructed and arranged substantially as set forth.

68,888.—OPERATING DRILL.—E. G. Lamson, Shelburne Falls, Mass.

1st, I claim the air spring substantially as and for the purpose described.

2d, The device whereby I regulate at pleasure the momentum of the blow struck by regulating the speed of the driving machinery, the greater the speed the harder the blow substantially as and for the purposes described.

3d, The device whereby I cause the piston head carrying the striking mechanism to operate in a different direction from the piston head attached to the driving mechanism, substantially as described.

4th, The mechanism for swinging out the drills longitudinally substantially as and for the purpose described.

5th, The mechanism for swinging out the drills laterally substantially as and for the purposes described.

6th, The mechanism for confining the drills in gangs substantially as and for the purposes described.

7th, The form and disposition of the cutting edges of the drills substantially as and for the purpose described.

68,889.—LAMP BURNER.—J. C. Love (assignor to W.H.Love) Philadelphia, Pa.

1st, I claim the wick tubes, B B, arranged adjacent to each other, in combination with a casing and with a dome or plate having a single opening through which the flames from both wick may pass and the edges of which are parallel to the sides of the wick tubes the whole being constructed and arranged as and for the purpose described.

2d, The case, C, with its partitions, a a, in combination with the tubes, B B, and dome, d, the whole being arranged substantially as and for the purpose specified.

3d, The combination of the above and the plate, c, and its lips, i i, arranged in respect to the openings, e, substantially as set forth.

68,890.—FAN.—Wm. Lucas, (assignor to Oliver Downing), New Haven, Conn.

I claim the two edges, D, slotted and pivoted between the plates, B, and arranged so as to operate substantially in the manner herein set forth.

68,891.—LIFTING JACK.—E. L. Marsh, Greenwich, Ohio.

I claim the lever, E, check yoke, G, and trapeze or swing, D, when constructed and arranged in combination with the standards, B, and base, A, in the manner as and for the purpose set forth.

68,892.—INVALID BEDSTEAD.—John Massey (assignor to himself and Peter M. Stagg), New York City. Antedated Sept. 7, 1867.

1st, I claim the combination with a bedstead of swinging arms or slugs, G, provided with stirrups or rests, m, for operation substantially as specified.

2d, The hinged portion, F, of the foot board constructed as described to form a table to the bedstead substantially as set forth.

68,893.—CLOTHES WRINGER.—G.M McMaster, Rochester, N.Y

1st, I claim the employment or use of the friction or traction pulleys either with or without a roughened periphery, arranged and operating substantially in the manner and for the purposes herein shown and described.

2d, The adjustable shaft, S, arranged and operating in connection with the driving shaft, G, and rollers, R and R', and coupling, h and d, substantially as and for the purpose set forth.

3d, The relative arrangement of the two separate side clamps, C, provided with a suitable dowel, p, and suspending strap, q, and when they are so made as to have each two separate bearings horizontally as and for the purposes specified.

68,894.—BRICK MACHINE.—J.. M. Moyer, Pittsburgh, Pa.

I claim the sickle or shear spuds, F, and lower knife or drag, H, in hopper, A, in combination with the raised bowl constructed arranged and operated in manner set forth.

I claim the knife, L, and plunger, M, constructed and applied in manner and form substantially as described.

I claim the brick wheel, N, with slots and grooves to admit molds operated substantially as set forth.

I claim the arrangement of the stop cam, U, in connection with knife, a, and arm, R, arranged and operating in manner described

I claim the mold with hinged base constructed and used as described, to and for the purpose intended.

68,895.—ATTACHING THILL TO CARRIAGES.—A. Odell N. Y. City assignor to himself and David Granger Collinsville, Conn.

I claim the combination of a shaft iron made as herein before described with an aperture, E, in it with the non-movable jaws of a jack substantially as described, and for the purposes hereinbefore set forth.

68,896.—BRICK PRESS.—C. D. Page, Rochester, N. Y.

1st, I claim the combination with the hopper, G, of the rack, c c c, and stamp, H, for filling the molds and giving the initial pressure, operating substantially in the manner and for the purpose specified.

2d, The thin passage, K, leading from the pug mill, combined with the roller, K, in the manner and for the purpose herein set forth.

3d, Giving the followers an upward pressure under the pug mill, as and for the purpose specified.

68,897.—STEAM TRAP.—B. F. Perkins, Holyoke, Mass.

1st, I claim a steam trap operated by two or more compound plates so arranged that the expansion or contraction of one is conveyed to the second and of those two, to the third, and last and valve, D, as represented at Fig., 1 and 3 E 1 2 3 4.

2d, Also the spindle, G, and nuts, E and H, the whole arranged and combined as herein described and for the purpose specified.

68,898.—COOKING STOVE.—Gustavus Perkins, Burlington, Vt.

1st I claim the elevated oven, d, and boiler, g, when arranged as described in combination with yoke, y, substantially as set forth.

2d, The hot air chamber, I, formed by the bevel of the two fire pots, H H, register, V, and aperture, W, substantially as and for the purpose set forth.

3d, The supplementary pan, L, for cleaning the flues of a cooking stove substantially as shown and described.

4th, A cooking stove consisting of fire pots, H H, ovens, E f and d, boiler, g, connected with d, by yoke, y, flue, J, dampers, M N O P Q R, all arranged and combined as herein set forth and described.

68,899.—HAT.—W. H. Plumb, (assignor to Henry de Tavala,) New York City. Antedated Sept. 4, 1867.

I claim a locking obstruction applied to the interior of the hat, operating, till unlocked and displaced or removed, to impede or prevent the wearing of the hat, substantially as specified.

68,900.—REVERSE LEVER PITMAN.—James and Wheelock W. Porter, Wauconda, Ill.

We claim the combination of a wheel, A, provided with pins, H, or their equivalents, levers. F, and pirman, E, arranged and operating substantially as and for the purposes specified.

68,901.—PLOW.—Wm. Richardson, Hookstown, Md.

1st, I claim the boxes, E E, substantially as and for the purpose described.

2d, The graduated beam, C, for the purpose specified.

3d, The graduated plow shanks, or plow standards, G' G', for the purpose specified.

4th, The arrangement of the removable plow, E, with the adjustable and removable plows, G G, substantially as and for the purpose specified.

5th, The combination of the plow shanks, G' G', the boxes, F F, the set screws, H H, and the cross beam, C, substantially as and for the purpose specified.

68,902.—FENCE POST PEDESTAL.—Jos. Robbins, Amherst, Ohio.

I claim the herein described pedestal when constructed with standards, B, ribs, D, and pin, E, in combination with the post, G, in the manner as and for the purpose set forth.

68,903.—SPADE FOR DIGGING POSTHOLES.—Matthew L. Roberts, Smithville, Canada. Antedated Sept. 8, 1867.

I claim the construction and arrangement of the blades, A A, hinged together at their upper ends by means of the ring segments, C C, and having the handles, B B, united to them at points equidistant from the joints thereof, substantially in the manner and for the purposes herein specified.

68,904.—CARRIAGE.—James Rock, Hastings, Eng.

I claim the employment of springs or weights, substantially as hereinbefore described, to counterbalance the movable parts of folding carriage or wagon heads or coverings, in order to raise or close, or to assist in raising or closing such heads or coverings.

I also claim the combination as well as the arrangement of the bent levers, b b1, the connecting rods, d d, and the springs, a a1, also, their combination with the jointed prop bars, l l, the carriage body and the movable back or part, e, hinged thereto.

I also claim, in combination with the carriage body, its joint bars, l l, movable back, e e1, and top piece, f f1, a means or mechanism, substantially as described, or the equivalent thereof, for effecting the movement of the joint bars so as to close their joints by turning the part, f f1, down into a horizontal position, such means being the angular teeth or feather, k k, of the prop pin, and the elongated eye of the upper joint rod, l, the whole being as shown in figs. 4 and 5, and as hereinbefore specified, the prop pin, g1, being fixed or applied to the part, f f1, so as to turn or be movable therewith.

68,905.—MACHINE FOR CLEANING HEMP, RAMIE, ETC.—R. Roezl, Santo-Comapam, Mexico.

1st, I claim the alternate concave and convex metallic curved table edges, B and C, constructed and applied substantially as and for the purposes set forth.

2d, The manner of securing the removable table edges, B and C, whereby they are made rigid or immovable when the machine is in operation.

3d, The revolving cylinder, A, armed with knives projecting from its perimeter for breaking up and extracting the wood, etc., from the fiber of ramie and other like plants, in combination with the removable table edges, applied and operating substantially as described.

4th, The method or process, herein described, of extracting the fiber from ramie and other like plants, consisting in first subjecting the plants to the action of the machine herein described, then soaking them in water, again subjecting them to the action of the machine, and finally placing them in a hot solution, as described.

68,906.—ANIMAL TETHER.—Walter S. Sargent and Frederick Flanders, Franklin, N. H.

We claim the combination of the cylinder, E, and piston, d, with the base block, A, standard, B, socket, C, and tethering pole, D, substantially as described.

68,907.—BRICK MACHINE.—Henry C. Sargeant, Columbus, O.

1st, I claim raising the follower so as to press a portion of the clay in the mold, and the expelling of the surplus from the mold, in the manner and for the purpose specified.

2d, I claim regulating the pressure by means of the sliding plate, as shown and described.

3d, I claim regulating the thickness of the brick by raising or lowering a section of a continuous track by means of wedges and screw, or their equivalents, as shown and described.

4th, I claim the construction of a propeller that the receiving and the discharging edges will operate on the clay, as shown and described and for the purpose specified.

68,908.—MANUFACTURE OF ICE, ETC. — Daniel E. Somes, Washington, D. C.

1st, I claim cooling and refrigerating and warming, substantially as herein described.

2d, The process of cooling and warming, as herein described, consisting in forcing or drawing spray into a vacuum, or partial vacuum, substantially as set forth.

3d, Cooling, condensing, heating, and refrigerating by means of the apparatus, substantially as described.

4th, The apparatus, herein described, constituting a vacuum, and devices for producing spray, substantially as set forth.

5th, A fly wheel, or balance wheel, revolving in a vacuum or partial vacuum.

68,909.—DERRICK.—A. B. Sprout, Picture Rocks, Pa.

First, I claim a derrick provided with a pivoted shaft, F, made operative through the medium of the rope, n, substantially as herein described, and for the purpose set forth.

2d, In combination with the above, the pulleys, P and i, and guide, g, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

3d, The combination of the weight, m, pulley, E, and rope, X, with the pivoted shaft, F, constructed, arranged, and operating substantially in the manner herein described, and for the purpose set forth.

68,910.—CULTIVATOR.—Eliza Stafford, Decatur, Ill., administratrix of the estate of D. S. Stafford, deceased, assignor to herself, Sullivan Burgess, and Joseph Stafford. Antedated Aug. 20, 1867.

I claim the pivoted curved plow standards, H, connected by the chains, J, substantially as and for the purpose specified.

68,911.—INSTRUMENT FOR MEASURING LUMBER.—Thomas B. Stevenson, Dayton, Ohio.

1st, I claim registering the quantity of material measured by a traversing rotary wheel, upon rotary and fixed dials, by an organization of mechanism, substantially as described.

2d, The combination of the shipping mechanism with an adjustable series of different sized pinions for changing speed, substantially as specified.

3d, The combination of the adjusting screw, H, arm, K, retracting spring, 14, and segmental notched plate, N, or their equivalents, operating conjointly in the manner and for the purpose described.

4th, The measuring wheel, A, in combination with the thumb spring, m, and detent, q, operating in the manner and for the purpose specified.

5th, The disk, S, in combination with arm, a, and rotary dials, R T I' I'', for recording the quantity measured, substantially as described.

6th, The shipping and adjustable mechanism represented in figures 6 and 7, in combination with the recording mechanism represented in figures 2 and 3, operating in the manner substantially as and for the purpose specified.

68,912.—BED BOTTOM.—W. Stickney, Lockport, assignor to Sarah E. Stickney, Waterville, N. Y.

I claim a bed bottom consisting of slats, A A, rigidly secured to the hinged sections, B B, in combination with the spiral springs, d d, and vertical guides c c, arranged and operating substantially in the manner described.

68,913. — MEASURING CAN. — David H. Sumner, South Boston, Mass.

I claim the duplex measuring can, composed of the two vessels, A B, the orifice, d, and the partitions, f g, arranged substantially as described, such can being provided with discharging spouts and a handle, as set forth, when such may be essential or necessary thereto.

68,914.—PISTON-PACKING RING.—S. Tucker, Worcester, Mass.

I claim the improved piston-ring section as furcated and recessed at and near one end and with recesses a tongue, E, and a lapping piece, F, at and near its end, the whole being in manner, substantially as represented in the accompanying drawings and as hereinbefore described.

68,915.—COOLING AND PURIFYING ANIMAL CHARCOAL.—D. H. Turner, New York city.

1st, I claim the process, substantially as herein described, of cooling and purifying animal charcoal, by agitating or giving it a series of successive or repeated lifts as it is passed through or along a reticulated cylinder or vessel through which a current of cold or cooling air is made to ascend, essentially as herein set forth.

2d, The combination for the purpose or purposes specified, of a revolving reticulated cylinder or vessel provided with lifting strips or otherwise equivalently constructed, upper trunk or flue for escape of the noxious gases and finer dust, serving also for the establishment of the draft, and suitable delivery shutes or devices for separate discharge of the coal and coarser dust, substantially as described.

68,916.—SPITTOON FOR RAILROAD CARS.—Benj. Van Deusen, Troy, N. Y.

I claim the combination of a tunnel or open-ended cup, B, with an open-ended spittoon or spout, A, as provided with a movable or swinging cover, and arranged and secured to and in the car floor in convenient positions to the seats thereof, substantially as and for the purposes herein set forth.

68,917.—DRIVEN PUMPS.—S. Waite, New Bedford, Mass.

1st, I claim the within described perforated drill-shaped point or shoe, b, applied to a perforated tube, a, and arranged in connection with a pump, substantially as and for the purposes set forth.

2d, The within described arrangement and combination of the rotating apparatus, the perforated shoe, b, and perforated tube, a, when applied to a pump, all being constructed and operated substantially as and for the purposes set forth.

68,918.—HAND LOOM.—Chas. Wandel, Milton, Iowa. Antedated Sept. 4, 1867.

I claim the construction and arrangement of the shaft, L, drum, K, arms or pins, J M, ratchet wheel, K2, pawl, R, arm or lever, N, spring, P, treadles, H, and lathe, E, as herein set forth, for the purpose specified.

68,919.—DEVICE FOR HITCHING HORSES.—W. G. Ward, Steuben County, N. Y.

I claim the combination of the handles, A and B, with the holes, H H, and the bridge, E, all being constructed and arranged substantially as and for the purposes set forth.

68,920.—ROTARY STEAM ENGINE.—John Q. Welch, Oswego, Oregon.

I claim the arrangement of the oblong circle, C, slot, P, in the shaft, S, slide, D, spring, W, aperture, y, and the escape at g, substantially upon the principle and in the manner as herein set forth.

68,921.—WASHING MACHINE.—J. W. Wetmore, Erie, Pa. Antedated Sept. 7, 1867.

1st, I claim the slats, l j, faced with flexible strips, k l, and the movable slats, m n, fig. 3, constructed and operated as described.

2d, The combination in the pounder, B, of the slats faced with strips, k l, movable slats, m n, hook, w, fig. 3, weight box, g' f'', lever, R, and springs, p r, fig 2, arranged as and for the purposes set forth.

3d, The combination of the separator, l m, fig. 2, with the pounder, B, as and for the purposes described.

68,922.—PERMUTATION LOCK.—Seth Wheeler, Albany, N. Y.

1st, I claim the application to a sliding bolt of the toothed and notched wheels, C D, having suitable indices applied to their shafts so that said wheels and indices shall move with this bolt, substantially as described.

2d, Providing a concentric slot in the toothed wheel or wheels within which the lugs, b b1 may be received for the purpose of allowing said wheels to be turned when the bolt is unlocked, substantially as described.

3d, The adjustable toothed spiders, F G, or their equivalents, applied to the toothed and slotted wheels, C D, in combination with the lugs, b b1, and devices for indicating the positions of the said slots, i i1, in said wheels when in line with said lugs, substantially as described.

68,923.—MODE OF LIGHTING FACTORIES AND OTHER BUILDINGS.—A. J. White, Ballston Spa, N. Y.

I claim, in combination with an air-tight reservoir and a series of conductors therefrom, with burners attached, the cocks, h and i, to operate substantially as and for the purpose described.

68,924.—CARRIAGE SHACKLE.—Levi Wilkinson (assignor to Oliver F. Case), New Haven, Conn.

I claim the combination of the detachable block, c, and the bar, b, when the said block itself forms a part of the bearing of the coupling, and when the whole is constructed and arranged so as to operate substantially as and for the purpose specified.

68,925.—CARRIAGE-CURTAIN FASTENER.—Amandus Woeber, Davenport, Iowa.

1st, I claim providing a rubber flap, with eyelet hole attached outside and over metallic eyelet, substantially in the manner and for the purpose as herein described.

2d, The rubber flap, with hole, as attached and arranged, in combination with metallic eyelet and curtain knob or button, substantially in the manner and for the purpose as herein described.

68,926.—SELF-ACTING WAGON BRAKE.—Jas. F. Wood, 2d, Cohocton, N. Y,

1st, I claim the forked right-angle lever, A, as constructed, and connected, with the tongue, or pole, D, and the rod, Q, to operate the brake bar, N, substantially as and for the purposes set forth.

2d, I claim the slotted metal plate, F, as constructed and attached to the pole, D, by the pin or bolt, C, to prevent the lateral movement of the pole while it allows it to move freely endways.

68,927.—HAMMOCK.—Arthur Woods, Liverpool, Eng.

I claim the hammock, herein described, having the body, a b, of a rectangular section sustained transversely by the cross-pieces, f, or their equivalents, and supported by the jib ends, c, so as to receive the several strains, and hold in shape the contents of the hammock, all substantially as and for the purpose set forth.

68,928.—KNITTING-MACHINE REGISTER.—B. F. Wyman, Lancaster, and B. H. Hartshorn, Ashland, Mass.

We claim the combination and arrangement of the shaft, f, the worm, i, the dial, r, the hand, s, and the stand, p, substantially as and for the purpose set forth.

68,929.—FILE.—Hiram Young, Carey, Ohio.

I claim a single-cut right-and-left file with the lines of its teeth on both sides of the blade, all inclining in the same direction, substantially in the manner and for the purpose described.

68,930.—WAGON STEP.—William Youngblood, N. Y. city.

1st, I claim the employment of a step or steps, secured upon the axle out side of the wheel or wheels of a wagon, and located immediately over the hub or hubs of said wheels, substantially as and for the purpose herein described.

2d, The construction and arrangement of the step, D, with the nut, C, and guard, E, substantially as and for the purpose set forth.

68,931.—MEASURE FOR LIQUIDS.—J. L. Abbott, North Providence, R. I., assignor to Chas. Pratt, Brooklyn, N. Y.

I claim the arrangement of the measure, A, pipe, I, two-way cocks, J, tube, K, adjustable bar, D, valve, H, and chamber, G, as and for the purpose specified.

68,932.—SLIDE VALVE.—Thos. Adams and Geo. J. Parsons, No. 5 Duke st., Adelphi, Eng. Patented in England Feb. 15, 1866.

I claim the slide valve, constructed in such a manner that, by the aid of a ring or rings, H, provided with a fillet, N, and recess, O, the pressure of the steam on the different parts of the surfaces, will be balanced, all being made and operating as herein shown and described.

68,933.—WINDOW-SASH STOP. — Jacob K. Andrews, New Providence, Pa.

I claim window stops, when made in two parts, and arranged, connected, and operated substantially as described and for the purpose specified.

68,934.—STEAM GENERATOR.—P. Atherton, Philadelphia, Pa.

I claim the arrangement of the bell-mounted flues, B C D E F, bearing wall, H, and chambers, J L M, having openings, N O, for the purpose of creating an increased amount of heating surface, as herein shown and described.

68,935.—BALING PRESS.—S. J. Austin, Freeport, Me.

1st, I claim the operating of the side, C, through the medium of the arms, E, applied at one end to the side, C, and having their opposite ends fitted in or between suitable guides with cords or chains, F, attached, which are connected to a shaft or windlas, G, substantially as shown and described.

2d, Providing one of the journals, o, of the shaft, N, with an external screw thread, p, to work in an internal screw in its bearings, or with an equivalent device to give the shaft, N, a longitudinal movement while being rotated, and thereby keep the chains or cords, m, in line with the arms K K K, substantially as set forth.

3d, The lips, l l' l', on the bevel block, J, and platform, I, substantially as and for the purpose herein set forth.

4th, The securing of the head block, J, in the framing B, by means of the dovetail cleat, k, on the framing, fitting in the dovetail groove, j, in the upper surface of the head block, substantially as set forth.

5th, The metal apron, P, attached to the platen, I, substantially as and for the purpose specified.

6th, The door, O, in the side of the press box, A, when used in combination with the sliding or expanding side, C, and the platen, I, arranged substantially as shown and described.

68,936.—APPARATUS FOR ROLLING RAILS.—Hugh Baines, Manchester, Eng.

I claim the rollers, P Q R and S, in combination with each other, when constructed and arranged together substantially as and for the purpose described.

68,937.—PORTABLE SHEEP SHED.—Wilson M. Baker and John Hisner, Urbana, Ohio.

1st, I claim the combination of the overlapping boards, G G G, and catches g2 g3, arranged as described and forming a detachable roof for a portable sheep shed, as set forth.

2d, The arrangement in a portable sheep shed of the pivoted side boards R, and closing bars, S, as and for the purpose explained.

3d, The rack, H, constructed as herein described, and extending longitudinally through the central part of the shed, in combination with the shed substantially as and for the purpose herein set forth.

4th, The combination of the arms, L, cords, M, and shafts, N, with each other and with the feeding troughs, K, and frame of the shed, substantially as herein shown and described, for the purpose set forth.

68,938.—STEAM ENGINE.—Wm. H. Bancroft and Wm. L. Ward, Portland, Wis.

We claim the combination of the first cylinder, B, having a central partition, B', and the main cylinder, C, with their respective pistons, said cylinders being constructed as to their ports, and arranged in relation to one another and to said pistons substantially as described.

68,939.—TWEER FOR FURNACES.—John Bayliss, N. Y. City.

I claim the chambered tweer, A, in combination with a water reservoir and air chamber and and suitable water and blast pipes, all constructed and arranged substantially as described.

68,940.—FIRE EXTINGUISHER.—J. F. Boynton, Syracuse, N.Y.

1st, I claim the method herein described of charging portable vessels with saline water and compressed air or gas, for use in extinguishing fires, substantially as set forth.

2d, I also claim the portable vessel, B, charged with saline water and compressed air or gas, substantially as described, for the purpose of extinguishing fires, as set forth.

3d, I also claim, in combination with the cylinder, A, portable receiver, B, the connecting pipes, C and D, cocks, 1, 2, 3, and 4, and any suitable pump for charging said cylinder, A, with compressed air or gas, all constructed and arranged substantially as described.

68,941.—CORN SHELLER.—C. H. Brady, Mount Joy, Pa., assignor to himself and Wm. Brady. Antedated Sept. 10, 1867.

I claim the combination of the revolving frame, B, as constructed and provided with the spring plates, H H, with the stationary case, A, provided with spout, a, and projection, b, as and for the purpose set forth.

68,942.—LUBRICATING OIL.—E. L. Brady, New Orleans, La.

I claim a combination of the various substances, to wit, oil, water, spirits of ammonia, carbonate of soda, quick lime, and sulphur, used to make the compound clarified and saponified lubricating oil known as Brady's oil.

68,943.—FRUIT BOX.—Israel F. Brown (assignor to E. F. Brown), New London, Conn.

1st, I claim the fastening, B, in combination with the bottom, G, and sides, H, as herein set forth, for the purpose specified.

2d, The bottom, G, to the box, applied thereto substantially as and for the purpose described.

68,944.—FOOT WARMER.—N. H. Bruce, Forge Village, Westford, Mass.

I claim the construction and arrangement of the perforated case, A, having the socket, B, lamp, C, hinged casing, D, inclined covered plate, F, with central opening, H, in which are secured the sheet metal plates, I, as herein shown and described, for the purpose specified.

68,945.—WATER WHEEL.—James D. Bryson, Newcastle, Pa.

1st, I claim the combination in a turbine water wheel of the adjustable gates or shutes, D, and adjustable buckets or issues, B', whereby the area of the issues may be varied to correspond with the regulated capacity of the inlets or shutes.

2d, In combination with the above, the slotted adjusting arms, I I, applied so as to open the gates simultaneously and permit them to close independently, so as to prevent the obstruction of one or more gates from interfering with the operation of the remainder.

3d, The combination with the adjustable buckets, B', of the adjusting staff or screw, L L', and swivel, l, applied and operating substantially as described.

4th, The combination of the staff or screw, L L', and swivel, l, hollow slotted spindle, E, jointed arms, N, and ring or collar, M, arranged as described and operating so as to permit the buckets to be adjusted while the wheel is in motion, as set forth.

68,946.—FILE CUTTING MACHINE.—Edwin Bucklin, Jr., North Providence, R.I., assignor to Frederick A. Soule, Dixon, Ohio.

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1st, I claim the combination of the bent arm, D, hammer, G, and set screw, F, arranged substantially as described.

2d, The combination of the bent hammer, G, provided with downwardly bent arms, G1 G2, spring, H, bent arm, I, set screw, H1, having a handle, I1, with the bent arm, D, secured on the adjustable plate, C, substantially as described.

3d, The adjustable hollow block, J, provided with a metal cap, J2, on one side, forming the bearing for the chisel stock, K, and holder, K1, substantially as described.

4th. The chisel stock, K, with a round top post, k, a shoulder, k2, and hollow three-sided part, k1, in combination with the holding device, K1, substantially as described.

5th, The combination of devices substantially as herein described, by which the chisel is elevated and brought down upon the file blank previous to the descent of the hammer upon the end of the chisel stock.

6th, The device for elevating and releasing the chisel and for holding the blank upon its bed, consisting of the toothed wheels, L1 M1 and M2, lever, l, shoulder, k2, on the chisel stock, K, and springs, n1 and h, and holder, K1, substantially as described.

7th, The device for operating the feed screw, consisting of the tappet, O2, adjustable slide, a, projection, a1, on the square rod, a2, pin, b1, inclined slot, b2, in the loose plate, b3, pawl, c2 and c5, and ratchet wheel, c1, secured to the shaft, c, substantially as described.

8th, The device for moving the file bed, consisting of the handle, e2, on shaft, d, provided with the square part, e1, set screw, e3, lugs, f1, pivoted arm, f, one end of which is provided with a cap, f2, having a female screw thread on its inner face, the other end being forked and holding the pivoted swinging piece, f3, substantially as described.

68,947.—DOOR AND BLIND FASTENING.—Daniel Bull, Amboy, Ill.

1st, I claim the construction of the spring door fastening for the purpose described, with the self-adjusting latching nose having a lip or locking projection formed on it, substantially as described.

2d, The spring door fastening for double doors, which, when both doors are shut, will be locked and held firmly in place by one of the doors, substantially as described.

68,948.—TABLE ATTACHMENT FOR BEDSTEADS.—Daniel Bull, Amboy, Ill.

1st, I claim the combination of an adjustable table, B, with a swinging support, A, constructed and adapted to operate substantially as and for the purposes described.

2d, Pivoting the table, B, to the bar, c, of the support, A, so that said table can be adjusted and set in a horizontal plane, and also inclined at pleasnre, substantially as described.

3d, In combination with the support, A, constructed as described, I claim the pivotng of the table, B, to a pivored bar, g, at one end, and to the curved portion, b, at the other end, substantially as described.

68,949.—MACHINE FOR ROUNDING FLY NET STRAPS.—C. K. Burkholder and Henry Lerew, Yorksprings, Pa.

We claim the combination of the notched knives, D J, and guides, E I, arranged and operating substantially as described.

68,950.—HORSE RAKE.—George E. Burt, Harvard, Mass.

1st, I claim in combination with the teeth, m, axle, O, and arm, J, a toggle joint formed by the levers C and B, acted upon by the weight of the driver riding upon a seat resting upon the joint in such manner that as the teeth are drawn back the toggle joint shall be straightened and the weight of the driver be made to act upon the teeth, a correspondingly increased downward pressure, substantially as set forth.

2d, The combination of the shafts, D, arm, F, levers, H E B and C, arm, J, and axle, O, substantially as set forth.

3d, The combination of the teeth, m, the axle, O, and clamp, I, when respectively constructed and arranged substantially as set forth.

4th, The combination of the shafts, D, arm, F, axle, O, and teeth, m, substantially as set forth.

5th, The arm, J, on one side of the axle, in combination with the arm, F, on the other side thereof, when connected with the shafts, D, one directly and the other through intermediate levers, H and E, or C and B, so arranged that the draft upon one and pressure against the other arm shall unite to turn the axle toward and hold down the teeth, substantially as set forth.

68,951.—CARRIAGE ATTACHMENT.—George J. Capewell, West Cheshire, Conn.

I claim, 1st, A holder or plate, B, for the fender rollers, A, made of such a form as to act as a step to the wagon or other vehicle, substantially as described.

2d, Securing the fender roller holders, B, to the vehicle, in such manner that the rollers can be adjusted without detaching the holders, substantially as described, for the prpose specified.

3d, The washers, F, at the ends of the rollers, A, for the purpose described.

68,952.—COMPOSITION FOR IMITATION WOOD.—Henry Carter, Taunton, Mass.

I claim, 1st, Making imitation wood by combining saw dust and glue, substantially as herein shown and described.

2d, The above in combination with metal dust and shaving, substantially as herein shown and described.

68,953.—INVALID SPITTOON.—John M. Cayce, Franklin, Tenn.

I claim a spitton having the lid, B, in combination with the lever, D, working in the handle, C, and operated by the button, d, substantially as and for the purpose specified.

68,954.—BED PAN.—Edwin M. Chaffee, Providence, R. I.

I claim the pipe, A, with supplemental chamber, a, outlet pipe, B, tube, C, with mouth piece and valve, g, when arranged and operating in the manner substantially as and for the purposes specified.

68,955.—MANUFACTURE OF MAGNESIUM.—John O. Christian, Manchester, Eng., and John and Henry Charlton, Strangeways, Eng. Antedated Sept. 15, 1866.

We claim, 1st, Producing sulphate of magnesia or other salts of magnesia during the process of generating carbonic acid gas, or of distilling tar water, or of manufacturing ammonia or its salts, substantially as herein set forth.

2d, Treating Dolomite or other magnesian compounds with sulphureted hydrogen, substantially as and for the purpose described.

68,956.—ATTACHING DOOR KNOBS.—D. B. Cobb, Jersey City, N. J.

I claim the metallic shank, B, provided with the socket, C, in connection with the nut, E, or its equivalent, and the knob, D, all arranged substantially in the manner as and for the purpose set forth.

68,957.—HORSE POWER.—S. Coin, Cazenovia, N. Y.

I claim the flange, C, to the horn wheel, A, substantially as and for the purpose described.

I also claim the links, F, constructed substantially as and for the purpose described.

68,958.—COMBINED HOE AND RAKE.—Isaac Cook, Haynesville, Mo.

I claim the cap, a, secured by the screw bolt, b, to the handle, A, through the side strips, a' a', for attaching a hoe and rake together or separately with the screw bolt, c', and the pins, d d, substantially as herein described.

68,959.—ADJUSTABLE TRACK FOR CONVEYING LOADS BY GRAVITY ONLY.—A. W. Cramer (assignor to himself and Wm. D. Brooks), Bethany, Pa.

I claim, 1st. the track, H, in combination with the track, B, formed by a wire or rope adjustably suspended at one end, that its inclination may be reversed, substantially in the manner set forth.

2d, The combination of the track, B, formed by a wire or rope, the sheave, C, axle, D, eye, F, and cord, a, arranged to reverse the inclination of the track, substantially as described.

68,960.—PRIMING METALLIC CARTRIDGES.—James F. Cranston, Springfield, Mass.

I claim a centerfice cartridge in which the anvil is constructed with a square face, A, and spring braces, C C', fastened in by the flange or groove, e e, and bridging over the cavity, b, in such a manner as to form the openings a f g h, substantially as set forth.

68,961.—ADJUSTABLE SPIRIT LEVEL.—L. L. Davis, Springfield, Mass.

1st, I claim the semi-circular bubble case, c, when constructed or cast in one piece, and having the aperture or space, l, for the insertion of the bubble glass, x, and the space, c', substantially as herein described and set forth.

2d, The ring, C, having a dovetail flange around its periphery and working in the dovetail socket, A', when made substantially as herein described and set forth.

3d, The ring, C, in combination with the dovetail socket, A', the set screw, g, the friction screw, g', and the bubble case, c, when made substantially as herein described and set forth,

4th, The elevating screw, j, and index, i, in combination with the base, A, socket, A', ring, C, and bubble case, c, when made substantially as herein described and set forth.

68,962.—SHEET METAL PAN FORMER.—W. H. Davis and R. H. Wagon, Dowagiac, Mich.

1st, We claim the lever, H, brace, D, shaft, I, former, F, and guide rods, P P, in combination with the box, A, as described and for the purposes set forth.

2d, The arms, M M, rod, L, and spring, a, in combination with the box, A as described and for the purposes specified.

68,963.—BALANCING MILL STONES.—Ephraim and Zedakiah Dawson and Brice Hilton, Bruncrsburg, Ohio.

We claim the above described arrangement of the balances, B, and, D, and the horizontal and perpendicular adjustment thereof as and for the purposes herein set forth.

68,964.—BOILER FEEDER.—Henry O. Demarest, N. Y. City.

1st, I claim the arrangement of the lever, D, heads, E E', and washer, e', substantially upon the principle and in the manner herein set forth.

2d, The arrangement of the chambers, A and A', lever, D, heads. E E' and E", nut, e, screws and washer, e', discharge pipe steam pipe, C, and the injection pipe, B, constructed and combined substantially as herein above set forth.

68,965.—MANGER.—Frederick Dengler, and Jacob Miller, Brooklyn, N. Y.

1st, We claim connecting the trap doors of mangers, feed boxes or troughs with clock-work in such a manner that the said doors can be simultaneously opened at any desired time substantially as and for the purpose herein shown and described.

2d, The disk, i, on the arbor of the clock-work, C, in combination with the lever, D k l and F, the latter being connected with the door or doors of the mangers, troughs or feed boxes substantially in the manner herein shown and described.

3d, The hinged bottom, r, of the feed box, H, in combination with the catch s, and swinging hook, t, the latter being connected with the clock-work, C, substantially as herein shown and described.

4th. The weighted cover, a, of the trough or manger, A, in combination with the catch lever, B, which is connected with the clock-work, C, substantially as and for the purpose herein shown and described.

68,966.—CARRIAGE SPRINGS.—Thomas DeWitt, Detroit, Mich.

I claim a carriage spring composed of the parts, B B C, connected together and used in connection with the studs, d d, arranged in relation with said parts substantially as herein shown and described.

68,967.—SPRING FOR FASTENING BLIND SLATS.—George H. Dimond, Bridgeport, Conn.

I claim a slotted concav o-convex discoidal shaped spring constructed substantially as described for the purpose of locking turning slats in position as set forth.

68,968.—ICE CREAM FREEZER.—Francis H. Duc, Charleston, S. C.

1st, I claim the revolving cylinder, D, when provided with the removable head, E, shaft, F, and wing, G, on the latter, the said shaft and wing serving as an indicator for ascertaining the state of the contents, substantially as herein shown and described.

2d, The above in combination with the box, A, having a hinged cover, C, in which another central cover, K, is arranged, substantially as and for the purpose herein shown and described.

68,969.—HAND LOOMS.—Thomas A. Dugdale, Richmond, Ind.

Antedated Sept. 7th, 1867.

1st, I claim the wheel, K, for operating the picking and harness mechanism the said wheel being formed of the flanges, U U V V, and ratchets, T.

2d, The combination of the wheel, K, hook, L, and pieces. M M, with the lay, B.

3d, The combination of the wheel, K, and sliding pieces, P P, and shafts, A2 and A5, and springs, S S, when arranged constructed and operated substantially as and for the purposes described.

68,970.—CARRIAGE JACK.—Joseph F. Emmert, Quincy, Pa.

I claim the construction and arrangement of the slotted stand, A, in which the toothed sliding lift bar, B, provided with the slide piece, D, works the lever, C, pivoted to the lug, h, at the bottom of the standard, A, and to the lower end of the link, d, whose upper end is pivoted to the lug, e, of the left bar, B, working in the slot, g, of standard, A, substantially as described for the purpose specified.

68,971.—GARDEN TILE FOR BORDERING.—F. B. Fancher, Lansingburg, N. Y.

I claim constructing garden tile for borders with right angled wings united by lap joints or tongue and groove substantially as and for the purpose herein shown and described.

68,972.—DEVICE FOR ROUNDING LINES.—L. B. Gates, Bane Center, N. Y.

I claim the spring, H H, in the frame, A, for securing the swinging frame, D, when constructed with its rollers, G and J, and combined with the roller, E, the whole operating in the manner and for the purposes specified.

68,973.—CHAIR LOUNGE AND STEP LADDER.—Joseph Gerdon, Jr., West Albany, N. Y.

I claim, in the chair and step ladder combined as described, the arrangement of the additional piece, h', with its leg, h", forming a lounge, and the fastening wires. l l, substantially as described, for the purpose specified.

68,974.—STILL FOR REFINING AND DISTILLING OILS.—Samuel Gibbons, Binghampton, N. Y.

I claim, 1st, The still or retort, A, in combination with the chambers, B B, constructed and arranged in the manner and for the purpose set forth.

2d, The use of the pipe, C, provided with a series of cross pipes or their equivalents in combination with the still A, as and for the purpose set forth.

3d, The arrangement of the pipe, D, chambers, B B, and still, A, with the steam pipe constructed and used as and for the purpose specified.

68,975.—DITCHING MACHINE.—Alford Gifford and Isaac Seright, Milroy, Ind.

We claim the arrangement of the knife, K, wheel, C, its circular knife scraper, b, and horizontal adjustable frame, regulated by the screws, g g, and provided with the plate, D, when used in the manner and for the purposes herein specified.

68,976.—PORTABLE FIELD FENCE.—E. C. Goddard (assignor to himself and A. Bailey), Unionville, Ohio.

I claim the herein described construction and arrangement of fence to form water locking sections, straight and irregular lines and gate ways, by the combination of the oblique slats, C C, with interlocking panels, A' B', and posts, conjointly.

68,977.—DUMPING CART.—N. W. Godfrey, Locust Val., N.Y.

I claim a cart or wagon having its bottom made in sections, and hung thereto with the rod or equivalent, to which each section is connected, in combination with the screen, e frame, when all constructed and arranged together, substantially as and for the purpose described.

68,978.—ORE CONCENTRATOR.—Lewis Goodwin, and S. A. West, San Francisco, Cal.

1st, I claim the concave rotary pan, A A, with circular riffles, g g g g g g g, having an elevation toward the periphery of the pan, substantially as and for the purposes described.

2d, The discharge box, E, receiving the discharge at the periphery, and discharging toward the center, having teeth or agitators attached to it for operating in the riffles and movable bar, L, to act on the pulp, and water, and the gate, F, for cutting off the discharge, substantially as described.

3d, The plow, O, valve, 4, spring, 5, cams, K and J, or their equivalents, substantially as described, for the purpose set forth.

4th, The stationary circular troughs, R, for receiving the sand and debris, and G, for receiving the sulphurets and the scrapers, N, attached to the rotary pan, and working within the troughs, R and G, substantially as described.

5th, We claim the above described parts, when employed separately or in combination, for the purposes specified.

68,979.—BAROMETRIC VACUUM EXHAUSTER.—James Gordon, and John Archbald, San Francisco, Cal.

We claim the combination of the closed water-purifying and supply cistern, H, with one or more expanding chambers, A A, which are combined with one or more tubes or barometric columns, B B, all substantially in the manner herein represented and described.

68,980.—CONSTRUCTION OF CARRIAGE BODIES.—Simon P. Graham, Richland Center, Ind.

I claim a carriage body made of sheet metal, formed in parts or sections connected together in the manner shown and described, as a new article of manufacture.

68,981.—WASHING MACHINE.—D. Hanna, Hornellsville, N.Y.

I claim the cylinder, B, covered with slats, e e e e, constructed in the manner described, when combined with a movable head, or follower, D, and an adjustable screw, F, nut journal, F, thumb screw, f, and operated by a crank, c, in the manner herein described, for the purposes set forth.

68,982.—SHOVEL PLOW.—W. R. Harmon, Union Port, Ohio.

1st, I claim the combination of the shoe, E, and shovel, F, when the same are so arranged that the shoe, E, presents its entire face to the ground, and projects sufficiently far beyond the point of the shovel, not only to protect and guard the same, but also to free the shovel from all labor and strain in opening the furrow, substantially as shown.

2d, I claim the combination of the rods, C C, guide plate, D, and bolt, c, for regulating the depth of cut of shoe, substantially as described.

3d, I claim the arrangement of the rods, C C, guide plate, D, and bolt, C, so that the same can be applied to a single or double plow, substantially as described.

4th, I claim the combination of the curved beam, A, shoe, E, and shovel, F, when the same are constructed and arranged substantially as described.

5th, I claim the combination of the beam, A, shoe, E, shovel, F, rods, C C, and guide plate, D, when the same are arranged and operated substantially as described, and for the purpose set forth.

6th, I claim the self-adjusting clevis, C, curved to the rods, C C, substantially as described, and for the purpose set forth.

68,983.—WAGON.—L. D. Harvey, Harvey, Mich.

I claim making the tongue hounds, A A, with the cross bar, a, and tubular head, b, all out of one solid piece, substantially as and for the purpose described.

68,984.—EGG CUP AND TONGS.—C. Hellen, Washington, D.C.

I claim the adjustable metallic egg cup, A, with its spring point, B, and base, C, combined with the tongs, D, as herein described, and for the purposes set forth.

68,985.—CUPPING APPARATUS.—W. D. Hooper, Liberty, Va.

1st, I claim cupping device, having a series of tubular blades arranged to operate substantially as shown and described.

2d, In combination with the cup, A, I claim the detachable mouthpiece, E, having holes for the blades to operate through as set forth.

3d, The combination of the mouthpiece, E, plate, D, having the blades, f, attached thereto, and screw, b, when arranged for joint operation as described.

68,986.—BRICK AND TILE MACHINE.—James Hotchkiss, and Ezra Buss, Springfield, Ohio.

We claim the extension of the pug-mill shaft, C, down through the plunger box, and providing it with a crank, G, or its equivalent, below, so as to drive the plunger thereof, substantially as herein specified.

We also claim solid division strip, Q, separating the plunger box into two compartments, M M, and in connection therewith, the division of the plunger, L, into two parts, striding the said division strip, and the pug-mill shaft, substantially as herein set forth.

We also claim the extended plunger beam, I, and connecting rod, H, pivoted to the outer end of the said plunger beam, arranged and operating together substantially as and for the purpose herein specified.

68,987.—APPARATUS FOR HEATING WATER AND GENERATING STEAM.—Henry Howard, Springfield, Mass.

1st, I claim an apparatus for heating water or generating steam, consisting of one or more double tubes, A and B, constructed as described, and combined with a water reservoir, substantially as and for the purpose set forth.

2d, Arranging these tubes in such a manner as to form a grate and fire box, and flues, for the passage of the flames and heated air.

68,988.—REIN HOLDER.—T. A. Huffer, Indianapolis, Ind.

I claim the combination of the plate, A, interlocking springs, a a a a, or their equivalent, and the screws, b b, in the manner substantially as and for the purpose herein set forth.

68,989.—ENGINE PISTON.—Nathan Hunt, Salem, Ohio.

I claim the construction and arrangement of the L-shaped packing rings, D, whose inner projections rest against each other, and are inserted in the space between the piston head, A, and follower, C, holding the packing rings, E, in position, said piston head and follower provided with inclined presses, e, upon their peripheries, to admit the steam behind the rings, B and E, alternately, at each upward and downward stroke of the piston, as herein shown and described.

68,990.—CHECK HOOK.—J. H. Jones, Williamsport, Pa.

I claim the smooth, concave roller, C, placed upon the hook, A, with its screw, B, in the manner herein described, and for the purposes set forth.

68,991.—FENCE.—Daniel Kaufman, Boiling Springs, Pa.

I claim the shoes, D, constructed substantially as herein shown and described, in combination with the lower ends of the inclined braces or supports, B, as and for the purpose set forth.

68,992.—HOISTING APPARATUS.—G. B. Keeler, Port Chester, N. Y.

I claim the combination of the shafts, D and F, having drums, pulleys, and pinions, and constructed substantially as and for the purpose described.

68,993.—HOSE COUPLING.—John Kerns, N. Y. city.

1st, I claim the combination of the tube, A, jaws, a a, with hooks, b b, springs, d, tube, B, with shoulders, c, as and for the purpose specified.

2d, The jaws, a a, on the tube, A, provided with hooks, b b, fitting into a groove in the tube, D, and forced together by a spring or springs, d, arranged between the jaws, a a, and tube, A, as herein shown and described.

68,994.—MECHANISM FOR OPERATING THE VALVES OF FORCE PUMPS.—John C. King, (assignor to himself and George M. Woodward), New York city.

I claim the rods, J J, by which the cylinders, H H', are connected, in combination with the cross bar, K, rock shaft, M, oscillating bar, L, box, g h i, and crank shaft, N, all made and operating substantially as and for the purpose herein shown and described.

68,995.—INJECTOR FOR INSECT POWDER.—M. Koppe, N.Y.c'y.

I claim an injector for insect powder, composed of a vessel, A, with elastic diaphragm, c, spout, b, spring, d, and thumb piece, e, substantially as and for the purposes set forth.

68,996.—GRAIN DRILL.—Elijah Lake, Davisburg, Mich.

1st, I claim providing the drill teeth, L, with wings, P, substantially as and for the purpose set forth.

2d, The use of a series of rollers, C C, in combination with the winged drill teeth for packing the earth after the wings, substantially as set forth.

3d, The arrangement of the collar, R, upon the shaft, B, with the wheel, D, and lever, q, whereby the seed shafts are thrown in and out of gear, as and for the purpose set forth.

68,997.—RAILROAD STATION INDICATOR.—George T. Lape, Summit, N.Y., assignor to himself and Jepthah Leathe, New York city.

1st, I claim the slides, d d, attached to the india rubber springs, e e, in combination with the apron, B, arranged and operating substantially as and for the purpose specified.

2d, The arrangement of the polygonal disk, C, spiral springs, s s', tubes, p p', chains, q q, rock wheel, E, cam, L, and apron, B, as and for the purpose specified.

68,998.—CHUCK FOR WATCHMAKERS' LATHES.—S. S. Lavey, Plymouth, Ind.

I claim the combination of the movable chuck, H, with its slides, J J, disc, F, and hollow head, composed of cups, C and D, and spring, e, constructed and used as herein set forth.

68,999.—MODE OF SECURING FELLY JOINTS.—James W. Lawrence (assignor to Brewster & Co.), New York city.

I claim the T-headed bolt, e, constructed as described, for securing felloe joints, laterally and radially substantially as and for the purposes herein described.

69,000.—SUBMARINE PLOW.—E. T. Ligon, Demopolis, Ala.

I claim a submarine plow, constructed and operating substantially as shown and described.

69,001.—UNITING STEEL OR IRON WITH COPPER.—E. T. Ligon, Demopolis, Ala.

I claim uniting seel or iron, and copper, substantially as described.

69,002.—SPINNING MACHINE.—John Lazier, Bellville, Canada.

1st, I claim mounting the carriage, M, on three wheels, arranged to run on the rails, C and C', substantially as shown and described.

2d, I claim providing the spinning frame with a register for determining the number of twists when said register is arranged to re-set itself automatically as the carriage is run forward, substantially as set forth.

3d, I claim arranging the mechanism herein described that feeds the roving or sliver in combination with the carriage in such a manner that as the latter is run back the former will be automatically thrown out of operation, substantially as described.

4th, I claim so arranging the devices herein described for throwing the feeding mechanism out of gear that they may be adjusted to stop the feeding sooner or later, substantially as described.

5th, The spiral springs, e, arranged to operate upon the pressure rolls, b, as described.

6th, I claim providing the feeding frame with the reel, G, and the two series of eyes, m and n, when arranged for joint action, substantially as described.

7th, I claim operating the feeding mechanism by means of its being so connected with the carriage that the moving of the carriage shall set it in motion by the unwinding of the cord, p, from the pulleys, R, said pulleys being rotated in the opposite direction by means of the weight, i, or its equivalent, when the carriage is returned, substantially as described.

69,003.—CULTIVATOR.—I. B. Mahon, Dunkirk, Ohio.

1st, I claim constructing the metallic frame of the machine in two parts, C C', connected together and braced, in the manner substantially as shown and described.

2d, Suspending the frame to the axle, A, by clips, D, arranged in connection with the braces, E, and the pendants, j, to which the outer plow beams are attached, all being arranged substantially as and for the purpose specified.

3d, The doubletree, U, pivoted to the draft pole, T, in connection with the whiffletrees, V V, pivoted to the frame of the machine and connected to the ends of the doubletree by links, r, all arranged substantially as set forth.

4th, The attaching of the inner plow beams, J J, to the front of the frame by means of universal joints, e e, substantially as described.

5th, The fender bars, L L, connected with the inner plow beams, J J, and universal joints, e e, and arranged in the manner shown so that the fenders, M, may be set at any desired hight and at a greater or less distance from the plows and have an independent up and down motion and at the same time retain their relative position with the plows, substantially as shown and described.

6th, The open or skeleton fenders, M, when applied to the fender bars, L L, so as to admit of being adjusted further forward or backward on said bars, substantially as and for the purpose specified.

7th, The pulleys or segments, c, on the shaft, I, connected by chains, d, to the plow beams, J J K K, in combination with the lever, S, connected by a chain, n, with a pulley, o, on shaft, I, all being arranged substantially as and for the purpose specified.

8th, The guides, G G, on the shaft, F, in connection with the uprights, N, passing through said guides and the stirrups, O, attached to said uprights, all arranged to operate substantially as described.

9th, The fixed guides, R, attached to the frame of the machine with the uprights, Q, of the outer beams, K, passing through the same, substantially as and for the purpose set forth.

69,004.—FINGERS FOR LIFTING LODGED GRAIN.—Samuel Manning, San José, Cal.

I claim the spring, A, bars, C and G, with the joint, D, and link, B, all arranged and applied to operate in the manner substantially as and for the purpose herein set forth.

69,005.—POTATO DIGGER.—Albert Marcellus, Pittsford, N. Y.

1st, I claim the arrangement of the nose plate, P, with its dividing lines vertical or nearly so and rounded, substantially in the manner and for the purposes herein shown and described.

2d, The arrangement of the wings, w and w', in combination with the uprights, S, to which they are connected suitably, as and for the purposes herein specified.

3d, The detachable mold boards, B B', in combination with the nose plate, P, and the wings, w and w', when the said boards are arranged with their faces or flat sides vertical or nearly so, as shown.

4th, Hinging the shakers, G and G', to the mold boards, substantially as described and vibrating them vertically, for the purposes set forth.

5th, The arrangement of the toothed upright, S, and toothed headed lever, T, with the friction roller, r, ratchet d, and its lever, f, substantially as shown and described for the purpose of gaging and adjusting the elevation of the plow.

6th, The detachable point, p, constructed and connected substantially in the manner and for the purposes herein shown and described.

69,006.—SOFA AND BED BOTTOM.—Casper Martino, Trenton, N. J.

1st, I claim securing one or both the ends of the spiral springs, B, in proper position by metallic straps, C, having loops struck up out of their solid bodies for the reception of the end coil of the springs, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the ratchets, F, pawls, E, rod, G, and spring, H, with the movable part, D, and with the frame, A, substantially as herein shown and described and for the purpose set forth.

3d, Securing the back, I, to the movable part, D, and to the frame, A, substantially in the manner herein shown and described.

69,007.—LIQUID AND GAS METERS.—Joshua Mason, Paterson, N. J.

1st, I claim the sliding valve, E, composed of the circular disks, b b', and the perforated plate, F, and fitted within the circular chamber, D, provided with ports, d d' d", extending circumferentially all around the interior of the chamber and placed or arranged in relation with the supply and discharge pipes, G I, passage, H, extension chamber, C, and cylinder, A, to operate in the manner substantially as and for the purpose ses forth.

2d, The operating of the valve, E, from the plunger, B, through the medium of the rods, K, plates, L, rod, M, segment, N, pinion, O, and spring, S, connected with the crank, k, of the shaft of the pinion, O, all arranged substantially as shown and described.

3d, The combination and arrangement of the rods, K, screw nut, g, plates, L, rod, M, and bar, J, as herein described for the purpose specified.

4th, The combination and arrangement of the clutch consisting of the fixed pin, a*, in the shaft of the pinion, O, and the slot, b*, in said pinion with the crank, h, spring, S, slotted segment, N, and plunger, B, as herein described for the purpose specified.

69,008.—BRUSH.—Francis McLaughlin, Boston, Mass.

I claim a brush made with a ferrule of vulcanized rubber or its compounds, substansially as described.

69,009.—MECHANICAL MOVEMENT.—Wm. S. Mead, N. Y. City.

I claim the combination and arrangement of the wheel, C, frame, A, handles, D, rocking arms, G, fly wheel, or other equivalent body, I, links, b, pitman rods, d, pendulum frame, J, and saws, K, all constructed and operating substantially as and for the purpose described.

69,010.—WEATHER STRIP FOR DOORS.—J. H. Miller, Milwaukee, Wis.

I claim the combination of the weather strip, D, hung to a swinging door plate, H, spring hinge, E, and projecting plate, L, of the door jamb, substantially as and for the purpose described.

69,011.—COMBINED RAKE AND SPADE.—W. H. Miller, Brandenburg, Ky.

1st, I claim the handle fastened to frame, E, carrying tines, substantially as described.

2d, I also claim the triangular tines, A, in cross section, substantially as and for the purpose specified.

69,012.—THREE-WHEELED VEHICLE.—John W. Minor and David P. Ward, New Bedford, Mass.

1st, We claim the sections of cylinders, C and E, one revolving within the other, substantially as and for the purposes herein shown and described.

2d, We claim the flange, D, projecting from the rim of the cylinder for fastening on the outside and forming a lip on its inner side, substantially as described.

3d, We claim the wheel, F, attached to a three-wheeled vehicle when the said wheel is attached to a horizontal section of a cylinder which has free horizontal motion, substantially as described.

69,013.—APPARATUS FOR DRAWING AND PRESERVING MALT LIQUORS.—Henry Mittendorf, York, Pa.

1st, I claim the herein-described mode of drawing and preserving malt liquors, cider, etc., by means of an air reservoir, substantially as set forth.

2d, The apparatus for drawing and preserving malt liquors, cider, etc., consisting of the air reservoir, B, air pump, C, pipes, a b and d, provided with stopcocks, c and e, substantially as described.

69,014.—TUBE EXPANDER.—E. J. Moore, East Boston, Mass.

I claim the construction of the expanding rollers, C, provided with beads

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surrounding their peripheries the lower one of less diameter than the upper substantially as described for the purpose specified.

69,015.—TRUSS.—F. W. Neubert, Pittsburg, Pa.

1st, I claim the pad. C, when made in the shape herein shown and described and for the purposes set forth.

2d, The truss straps, D and E, when covered with india-rubber cloth, substantially as described for the purpose specified.

3d, In combination with the truss strap, E, covered with india-rubber cloth, I claim the elastic portion, g, substantially as described for the purpose specified.

4th, The double straps, D and e, at the end of A, in combination with the knob, a, on pad, C, and with the knob, i, on spring, A, as set forth.

5th, The strap, E, in combination with the loops, h h, and knob, a, on the pad, C, all made and operating substantially as herein shown and described.

69,016.—CURRY COMBS.—E. M. Noyes, Binghamton, N. Y.

I claim the construction and use of the non-metallic teeth, A A, attached to the metallic casing, B, in combination with the curry comb on back, C, substantially as and for the purpose herein set forth.

69,017.—COFFEE POT.—Philander Perry, Charlestown, Mass.

I claim the combination and arrangement in a coffee pot of the movable perforated tank, G, and the tunnel, H H*, with the close concave radiator or diaphragm support, J, when the latter is removable, all substantially as and for the purpose described.

69,018.—HARVESTER.—G. M. Peters, Jr., Granville, Ohio.

I claim the combination of the two endless aprons or carriers, I J, constructed and operating as deseribed, frames, H C, axle, A, and sickle, O, with or without the guides, P, all arranged to operate substantially as and for the purpose set forth.

69,019.—CONDUCTORS' TICKET PUNCH.—William J. Phelps, Springfield, Mass.

1st, I claim the combination of the lever, B, and die spindle, h, pivoted thereto, with the slotted lever. A, guide, p, and female die, m, the whole arranged and operating substantially as set forth.

2d, The arrangement of the slotted lever, A, and female die, m, lever, B, and male die, h, in combination with the spiral spring, C, substantially as described.

69,020.—TRUSS.—Wm. Pomeroy, Brooklyn, N. Y.

1st, I claim the block or shoulder, D, and eccentric, E, constructed as described for the purpose specified.

2d, The rotating arm or slide, I, attached to one end of the body spring, A, and secured in position, when adjusted, by a set screw constructed and operating substantially as and for the purpeses herein described.

3d, The sloted end of the rotating arm, I, used in connection with a pad spring and a screw, K, substantially as herein shown and described, and for purpose set forth.

69,021.—CLOTHES HOOK.—S. S. Putnam, Dorchester, Mass.

I claim the bracket, A, in combination with the hook, C, constructed and operating substantially as described for the purpose set forth.

69,022.—STALL FOR ANIMALS.—S. S. Putnam, Dorchester, Mass.

I claim the bar, B, or its equivalent in combination with the stall, A, the bar being so constructed and applied that it will yield in an upward direction and drop to its original position when released, substantially as and for the purpose described.

69,023.—CLOTHES DRYER.—D. B. Randall, and A. A. Williams, Glover, Vt.

1st, We claim the combination of the guideway, B, or its equivalent, guide, C, and frame, D, with each other substantially as herein shown and described and for the purpose set forth.

2d, The jointed central bar of the frame, D, in combination with the guide, C, and guideway, B, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the adjustable brace bar, E, with the guide, C, and central bar, d' of the frame, D, substantially as herein shown and described and for the pursose set forth.

69,924.—GATE.—Edwin Reynolds, Metomen, Wis.

I claim the combination of fence panel, A, with gate, B, when the same are provided with an elongated bar or upright. a, adjustable pieces, h m, and pulleys, e g, all constructed, arranged and operated in the manner and for the purpose set forth and described.

69,025.—FURNACE FOR SMELTING ORES OF SILVER.—A. H. Richardson, Denver, Colorado.

I claim a smelting furnace having the blast supplied upon the ores in a furnace box provided with an apron in manner as above set forth and furnished with three apertures at different levels, in manner and for the purposes substantially as above set forth and described.

69,026.—RACK FOR BROOMS, BILLIARD CUES, ETC.—E Richmond, Brooklyn, N. Y.

1st, I claim in a rack for holding or suspending brooms, cues and other articles as described, the slits, lined or provided with a suitable elastic or binding device, and formed in the side or edge of the rack so as to communicate with the perforations or recesses in the said rack as and for the purposes set forth.

2d, The combination with a rack in which articles are held or suspended by means of rubber or equivalent elastic body, of a plate or equivalent means for supporting the buts or lower ends of said articles, as set forth.

69,027.—HITCHING POST.—D. C. Robie, (assignor to himself and Moses Goldthwaite), Springfield, Mass.

I claim the hitching post constructed of a closed top and an opening, e, on its side communicated with the annular space, a, for the purpose and in the manner substantially as described.

69,028.—TRUSS.—John L. Rowe, New York City.

I claim the springs, c, connected with and extending from the springs, a, in the manner specified in combination with the pad plate, g, to which they are united by one bolt in the manner and for the purposes set forth.

69,029.—CHURN.—M. V. B. Rowley, Worcester, N. Y.

1st. I claim the working beam, L, securely attached to the pendulum rod, O, whereby the pitman, K, is carried past its center as herein set forth for the purpose specified.

2d, The combination of the working lever, L, pendulum and rod, O P, pitman, K, and crank wheel, J, substantially as described for the purpose specified.

69,030.—APPARATUS FOR WASHING ORES.—Newell S. Ryder, Greenland, Mich.

1st, I claim a buddle, A, so suspended and operated that while it has a lateral rocking motion, it shall at the same time have a longitudinal oscillation substantially as and for the purpose set forth.

2d, A buddle when constructed and arranged so that the floor is higher at the tail than at the head so suspending it that in rocking laterally the axis of oscillation shall be higher at one end than at the other substantially in the manner set forth.

3d, I claim the arrangement of the seive, B, box, A, and pipes, I and K, substantially as set forth.

69,031.—PUNCH.—Edward Schindler and Charles H. Metzger, Easton, Pa.

1st, I claim the levers, C D, when connected by the straps, b, the former provided with the set screw, K, the latter provided with the removable punches, k, arranged in relation with the longitudinal adjusting plates, E F, substantially as described for the purpose specified.

2d, The adjusting plates, E F, when provided with flanges upon their upper ends whereby the leather is taken from the punches when the latter are raised as herein shown and described.

3d, The gage, h, when arranged in relation with the bed plate, g, whereby the distance apart of the holes to be punched is governed substantially as described for the purpose specified.

4th, The arrangement of the flanged adjustable guides, E F, gage, h, plate g, and punches, k, substantially as described for the purpose specified.

69,032.—COAT AND HAT HOOK.—William Schmitt, N. Y. City.

I claim the hinged hook jaws, B C, in combination with a spring latch or other locking device constructed and operating substantially as and for the purpose described.

2d, In combination with the hook jaws, B C, the elastic tips, d, substantially as and for the purpose described.

3d, The clamp, F, in combination with the hook jaws, B C, and with a suitable locking device constructed and operating substantially as and for the purpose described.

69,033.—DOOR BOLT.—Arthur H. Sherwood, Southport, Conn.

Antedated Sept. 7th, 1867.

I claim the above catch, G, in combination with the bolt, D E F, substantially as and for the purpose specified.

69,034.—BOW IRONS FOR VEHICLES.—George W. Slater, New Haven, Conn.

1st, I claim the bed plate, A, constructed of one piece as and for the purpose set forth.

2d, The slats, g, so formed as to be attached to the bed plate, A, by means of knuckles, d, in the manner herein described.

3d, The cars, s, on slats, g, used in forming thimbles to receive the bows as herein set forth.

4th, The bed plate, A, in combination with slats, g, and bows, c, the whole constructed and operating substantially as herein set forth.

69,035.—WAGON BRAKE.—A. P. Smith, Greensburgh, Pa.

I claim the combination with the running gear of the wagon, of the sliding bed, the friction rollers, the inclined slots, the draw bars. the rock-shaft and the brake lever, the whole being constructed, arranged and operating as described.

69,036.—HORSE RAKE.—G. W. Snyder, Kalamazoo, Mich., assignor to himself and James Aiken, Mendota, Ill.

1st, I claim the arrangement of the rake, C, with its plates, g g, pawl, m, bar, l, shield, i, and lever, e, with the swinging frame, G, in the manner and for the purposes specified.

2d, The combination of the axle, A, with its wheels and thalls, A', provided with shaft, b, with lever and ratchet rake shaft, c, with teeth, a a, frame, G chains, H H, and pawl, m, with lever, e, all arranged and used in the manner set forth.

69,037.—HYDROCARBON VAPOR MACHINE.—James F. Spence, Brooklyn, N. Y.

1st, I claim the combination and arrangement of the three chambers, B C E, with the reservoirs, D D, and supply pipes, d d r, substantially as and for the purpose set forth.

2d, The two rotating drums, H, provided with chambers, e, in combination with the tubes, o, substantially as and for the purpose specified.

3d, In a hydro-carbon vapor machine, the employment or use of a plurality of hydrocarbons of different grades placed in one or more chambers of the machine, substantially as and for the purpose set forth.

4th, The valves, F, constructed of cork or other similar light material when used in connection with a hydrocarbon vapor machine substantially as and for the purpose set forth.

69,038.—ODOMETER.—James C. Spencer, (assignor to himself and Archibald B. Vandermark,) Phelps, N. Y.

I claim the combination of the cog wheels, D and E, in the box, C, the worm gear, a, the ratchet wheel, c, operated by the spring pawl, d, on the rock shaft, e, and the hub, A, provided with the pin, h, for giving motion to the rock shaft by the arms, g g, arranged and operating substantially as herein described.

69,039.—FIRE ALARM TELEGRAPH.—Joseph B. Stearns, Boston, Mass.

1st, I claim the employment of reverse currents for operating the bell striking mechanism in the manner and for the purpose specified.

2d, I claim successively engaging and disengaging the arms, b b', of a bent lever attached to the weighted shaft of the bell striking mechanism by the movement of a magnetized armature which by means of reverse currents, is caused to oscillate between two electro-magnets in the manner set forth.

69,040.—PEGGING MACHINE.—Henry C. Stone (assignor to himself and John C. Gibbs), Brookfield, Mass.

1st, I claim the combination with the peg-wood carriage or table, B, having two or more grooves, a a1, or their equivalents, of a switch, J, substantially as and for the purposes set forth.

2d, The combination of the switch, J, with the peg-wood carriage, B, and peg guides, E E1, substantially as and for the purposes set forth.

3d, The combination with the peg guide, E, of the adjustable, guide, o, substantially as and for the purposes set forth.

4th, The combination of the lever, H, with the switch, J, substantially as and for the purposes set forth.

5th, The combination with bar, G, and pawls, 1 and g, of the connections, h and i, and slotted lever, H, substantially as and for the purposes set forth.

6th, The combination, in a pegging machine, of mechanism, substantially such as above described, whereby the operator can change from one length of peg to another without stopping the machine, as stated.

69,041.—HANGER.—Joseph M. Stone (assignor to Davis & Furber), North Andover, Mass,

I claim, in a hanger so constructed and arranged as to allow free motion of the shaft-supporting box automatically on both of two axes, provision for hanging the box by adjustable entering pivots within a frame, which frame is also held or suspended by adjustable entering pivots.

Also, the construction of the hanger in two parts, arranged with respect to each other and to the shaft-bearing box, substantially as described.

Also, the combination of the shaft box with the pivoted hoop, substantially as described.

69,042.—BELTING FOR DRIVING MACHINERY.—M. A. Strouvelle, St. Louis, Mo.

I claim raw hide belting for machinery, as a new article of manufacture, prepared substantially as herein described.

69,043.—DISINFECTING COMPOUND.—Ernst Suvern, Halle, Prussia.

I claim a disinfecting compound, composed of the ingredients herein described, and mixed together substantially as and about in the proportion set forth.

69,044.—SHAFT COUPLING.—J. W. Taylor, Oshkosh, Wis.

I claim the hollow cylinder, a, provided with friction rollers, e e, substantially as described, when used in combination with the dual pronged head, c, as and for the purposes set forth.

68,045.—HAY SHOCKER.—Clark M. Terrell, Oskaloosa, Iowa.

1st, I claim the mode of retracting the teeth, F, by means of the crank shafts, H, in combination with the cam, I, substantially as set forth.

2d, In combination with the cylindrical shell, A, and teeth, F, a receiving platform for sustaining the operator in forming a shock upon the hinged platform, K, substantially as set forth.

3d, In combination with a hay-elevating cylinder, A, and receiving platform, G, arranged to operate substantially as described.

4th, The platform, K, hinged to the machine, and supported by a spring so arranged as to discharge the shock by the action of gravity merely, substantially as set forth.

5th, The combination of the hinged platform, K, with curved teeth, K1, and the supporting spring, N, substantially as and for the purpose set forth.

6th, In combination with the revolving cylindrical shell, A, the band, O, arranged to operate substantially in the manner and for the purpose set forth.

7, So attaching the plattorms, G and K, that they may be detached, and the machine may be converted into a tedder, substantially as set forth.

69,046.—WINDOW SASH.—Robert Thomas, Parkersburgh, West Va.

I claim the short bars, E, hinged to the bars, E1, of the lower sash, adapted to catch into notched plates, F, secured in the window frame, whereby the bars, C C1, are held in position so that they will not be drawn up by the weight when the sash, D, is removed, substantially as described for the purpose specified.

2d, The sash, D, when provided upon one side, with the hooks, d, fitting into notches of plate, f, upon the short bars, C, and upon the opposite side with reversed hooks, g, fitting into the notched plate, l, upon the long bars, C1, as herein set forth for the purpose specified.

69,047.—HAND LOOM.—T. G. Thompson, Richmond, Ind., and A. F. Fox, Greensboro, Ind., assignors to Thompson, Ballard & Co., Richmond, Ind.

1st, We claim the sliding latch bar, C, having projections, q and p, in combination with the posts, a, of the batten, B, and the ratchet cam, s, arranged and operating in the manner set forth.

2d, The combination and arrangement of the spring, l, constructed as described, with the lay triggers and their operating straps, as and for the purpose described.

3d, The handle, H, combined with the batten top, in the manner described and for the purpose specified.

69,048.—DEVICE FOR HITCHING HORSES.—J. B. Thornton, Madison, Wis.

I claim a device for hitching horses, constructed and applied to wheel hubs, substantially as and for the purpose described.

69,049.—FRUIT LADDER.—Benj. F. Turner, Bridgeton, N. J.

1st, I claim the hooks, E, when applied to or used in combination with an extension ladder, substantially in the manner as and for the purpose herein set forth.

2d, The base, G, constructed with the pivoted braces, h h, when applied to or used in combination with an extension ladder, substantially as and for the purpose specified.

3d, In combination with the above, I claim the adjustable platform, H*, as herein set forth for the purpose specified.

69,050.—FOLDING CHAIR.—E. W. Vaill, Worcester, Mass.

1st, I claim the blocks. G G1, hinged to the legs and arms of the folding chair, and constructed and operating substantially as and for the purpose described.

2d, The folding chair, above described, consisting of the standards, A A1, legs, B B1, traverses, T T, cross bars, C C1, pivots, a a1, rounds, R R, curved slotted arms, D D1, and hinged blocks, G G1, all constructed, combined, and operating substantially as and for the purposes specified.

69,051.—BOOT HEEL.—Robert Vandervort, Pittsburgh, Pa.

I claim the metallic heel, C, with the front projecting lip, n, and internal recess or shoulder, i, held in place by means of the plate, A, secured firmly to the sole, and screws, b and e, as herein set forth.

68,052.—FASTENING FOR BREASTPINS.—A. R. P. Walker, Richmond, Me.

I claim the pin, A, constructed as described, consisting of the head, a, twisted through the undivided eye, b, of the plate, B, and provided with the lateral turn, C, the end of the head, a, resting upon the plate, all operating as described for the purpose specified.

69,053—REGULATING DEVICE FOR WATCHES.—Andrew Warren, Waltham, Mass.

I claim in combination with the indicating regulating lever or wheel having a spiral formation and arranged to both hold and move said lever, substantially as described.

Also in the said combination I claim the employment of two or more pins in the lever and gearing into the spiral, when the relation between the spiral and the pins is substantially that specified.

69,054.—DEVICE FOR MIXING LIQUIDS.—George Watkins, Brooklyn, N. Y.

I claim the adjustable beaters, C C, connected with the shaft, E, and suspended from the adjustable cross bar, c', all constructed, arranged and operating as herein shown and described.

69,055.—HEAD BLOCK FOR SAW MILLS.—Titus Whitmore, Dubuque, Iowa.

I claim the combination and arrangement of the index wheel, T, having cam, W, spring, a2, slotted arm, n, carrying pin, y, spring pawl lever, e2, arm, V, dog, a2, upon shaft, I, pinion, K, clutch, L, gear wheel, O, and band wheel, O, and feed screw, S, whereby the log is set to the saw as herein set forth for the purpose specified.

69,056.—DEVICE FOR SEWING MACHINES.—Lewis R. Wiggin, Farmington, N. H.

I claim the tank, A, water chamber, B, and steam worm or tube, D, combined and arranged substantially as and for the purposes above set forth and described.

2d, The supplementary tank, A', and prolongation, D', of the worm or steam tube, D, and rubber presser, I, in combination with the tank, A, steam generator, C, and worm, D, substantially as and for the purpose above set forth and described.

69,057.—STEAM PRESSURE GAGE.—C. A. Wilson, Cincinnati, Ohio.

I claim the arrangement of the three vertical tubes, B C D, horizontal duct, E, and four way cock, I, with passages, F and G, and ventage, H, substantially as and for the purpose described.

69,058,—TRACE AND PAD BUCKLE.—E. B. Winslow, Chatham, Ill.

I claim a combination trace and pad buckle formed of the sides, a a, connected by the bars, b b' m and q, and having a trace tongue, n, attached to a swivel bar, p, constructed, arranged and operating substantially as herein described.

69,059.—WASHING MACHINE.—J. W. Woodruff, Watson, Ill.

I claim the sliding handles, B B, box, A, spring, a, and beater, E, all being combined and operated as and for the purpose set forth.

69,060.—BENDING MACHINE.—J. N. Woodward, Aurora, Ill.

I claim, 1st, The rib, C, on the bed plate, A, in combination with the cap, D, and adjustable bars, a a, said parts being arranged to operate substantially in the manner as and for the purpose set forth.

2d, The springs, F E, respectively in bed plates, A, and cap, D, arranged in connection with the rib, C, and adjustable bars, a a, to insure the ready removal of the swaged sheet-metal strip, substantially as described.

3d, The combination of the cap, D, provided with the adjustable bars, a a, and placed on the rods, B B, having springs, e, upon them, the rib, C, on the bed plate, A, and the lever, G, all arranged for joint operation substantially as and for the purpose set forth.

REISSUES.

2,765.—LANTERN.—Wm. Westlake and James F. Dane, New York city, assignees of Conrad Gersten. Patented Jan. 25, 1859.

1st. We claim the deflector, q, constructed and operating substantially as and for the purposes specified.

2d, The mode of controlling the current of air which feeds the flame by causing it to pass down in a narrow annular space or passage to the aperture leading to the burner, in combination with a deflector, substantially as specified.

3d, Combining with the burner and the oil reservoir, and interposed between the two, an air chamber for preventing the oil from being overheated, as described.

2,766.—LANTERN.—Wm. Westlake and James F. Dane, New York city, assignees of Conrad Gersten. Patented Jan. 25, 1859.

1st, We claim extending the spindle for operating the wick ratchet through the outer casing of a lantern, substantially as and for the purposes specified.

2d, A spindle extending through the outer casing of a lantern, so combined with a toothed wheel or rotating device and wick tube, so that the wick may be adjusted without removing or changing the lamp.

3d, The spindle, k i, button, m, and tube, l, in combination with the ratchet and wick tube of a lantern, substantially as specified.

NOTE.—In the above list of patents, FIFTY-SEVEN were obtained through the office of the SCIENTIFIC AMERICAN.—EDS.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., 37 *Park Row, N. Y.*

20,534.—APPARATUS FOR MANUFACTURING GAS.—John Absterdam, New York city. Dated June 15, 1858. Application for reissue received and filed Sept. 6, 1867. Division A.

I claim passing atmospheric air through channels or chambers, the walls of which are wholly or partially lined with or composed of cloth or other porous and absorbent material, which elevates by absorption or capillary attraction the fluid in the chamber or channel, allowing sufficient space for the passage of the air, substantially as and for the purpose described.

20,534.—APPARATUS FOR MANUFACTURING GAS.—John Absterdam, New York city. Dated June 15, 1858. Application for reissue received and filed Sept. 6, 1867. Division B.

I claim passing illuminating gas through channels or chambers, the walls of which are wholly or partially lined with or composed of cloth or other porous and absorbent material, which elevates by absorption or capillary attraction the fluid in the chamber or channel, allowing sufficient space for the passage of the gas, substantially as and for the purpose described.

56,879.—TWEER.—John Bayliss, New York city. Dated Aug. 7, 1866. Application for reissue received and filed Sept. 7, 1867.

I claim a tweer, A, having a water chamber, B, provided with connecting water and steam pipes, D and E, in combination with the air pipe, H, air chamber, I, and air pipe, J, arranged together and operating substantially as and for the purpose represented and described.

61,396.—HAND STAMP.—E. D. Chamberlain, Westfield, N. J., and Charles H. Brown, New York city, assignees of Dexter H. Chamberlain. West Roxbury, Mass. Dated Jan. 22, 1867. Application for reissue received and filed Sept. 9, 1867.

1st, I claim the combination of any number of type wheels with a stamping lever, substantially as and for the purpose described and shown.

2d, The combination of a stamping lever with type wheels and inking ribbon, substantially as and for the purposes hereinbefore shown and described.

3d, The die holder, E, constructed and combined with the lever, c', substantially as and for the purpose shown and described.

4th, Making the type wheels, a b c, of different diameter, rotating upon separate and distinct axes, a' b' c', substantially as and for the purpose shown and described.

5th, The combination of the inking ribbon with the type wheels, substantially as herein described, so as to present a double fold of the ribbon under the type wheels, all as set forth,

6th, Having the type wheels provided with recesses for the reception of pawls or detent pins, substantially as described, for the purpose of securing the wheels, and permitting the convenient change of said wheels, all as set forth, in combination with the lever.

7th, The ribbon box formed in and making a part of the lever, substantially as and for the purpose shown and described.

8th, The employment of type wheels of different diameters, in combination with a lever hand stamp, substantially as and for the purposes herein shown and described.

2,725, whole No. 33,729.—MEANS OF SEALING PRESERVE CANS.—Henry S. Fisher, Newburgh, Pa. Dated Nov. 12, 1861. Application for reissue received and filed Sept. 7, 1867.

1st, I claim a self-adhesive seal which is prepared either in the form of a sheet, ring, disk, or piece of any required size or shape, and composed of paper which is thoroughly saturated and coated on its surface with a cement composed of the within described substances or the respective equivalents thereof, substantially as described and for the purpose specified.

2d, A self-adhesive seal which is composed of paper thoroughly saturated and coated with a resin cement, and afterward subjected to considerable pressure, so as to adapt the seal for hermetically closing preserving vessels, substantially as described.

3d, A seal which is composed of paper and cement, in combination with a compressing and retaining device, C, or its equivalent, substantially as and for the purposes described

9,387.—MODE OF THROWING SHUTTLES IN LOOMS.—Stephen C. Mendenhall, Richmond, Ind. Dated Nov. 9, 1852, Application for reissue received and filed Sept. 4, 1867.

1st, I claim the combination of the picker spring, k, pickers, i i, inclined cams, j j, triggers, f f', cords, h h, treadles, 1, 2, 3, 4, and batten or lay, B, so that the forward motion of the batten shall set the pickers, and the backward motion of the batten shall release them alternately, by means of the cords and treadles, and thus drive the shuttle back and forth through the warp, substantially as and for the purpose set forth.

2d, I claim the picker spring, k, in combination with the pickers, i i.

3d, I claim the pickers, i i, in combination with the inclined cams, j j.

4th, I claim the pickers, i i, inclined cams, j j, in combination with the triggers, f f'.

5th, I claim the pickers, i i, in combination with the triggers, f f'.

6th, I claim the combination of the triggers, f f', cords, h h, and treadles, 1, 2, 3, 4.

7th, I claim the spring triggers, f f', in combination with the batten, B, when the same are used for retaining the pickers, i i.

8th, I claim alternately releasing the pickers, i i, when the same is effected by the regular successive depression of the treadles, 1, 2, 3, 4.

65,963.—SLEEPING CAR.—John Swan, Baltimore, Md. Dated June 18, 1867. Application for reissue received and filed Sept. 5, 1867.

1st, I claim a series of state rooms made crosswise of the car and provided with a side passage and independent ventilation, substantially as and for the purposes set forth.

2d, The reservoir, F, pipes, H H, and basins, J J, for supplying water to the state rooms, substantially as specified.

3d, The side passage, C, when used in combination with a series of cross berths or state rooms, as and for the purpose set forth.

61,956.—COOKING STOVE.—J. J. Savage, Troy, N. Y. Dated Feb. 12, 1867. Application for reissue received and filed Sept. 6, 1867.

1st, I claim the location of the fuel doorway or feed mouth, B, of stove furnaces, substantially below and forward of the combustion or flame chamber, C, thereof, in such intermediate or contiguous position to the fire box, A Y, thereof, as to admit of fresh fuel being fed thereinto, in manner substantially as hereinbefore described, for the purposes set forth.

2d, I claim the extension of the fire box, A, forward of the combustion or flame chamber, C, of stove furnaces, and immediately under or contiguous to the aforesaid located fuel doorway, B, thereof, in manner substantially as herein described, for the purposes set forth.

3d, I claim a level feeder, F, substantially as described, when operated in combination with or through said located feed doorway, B, of stove furnaces, in manner substantially and for the purposes as herein set forth.

4th, I claim providing a feed lever, E, with a fulcrum hook, c, or an equivalent therefor, when used in combination with a fulcrum, ridge, or bearing, d, arranged on the edge of the aforesaid located fuel doorway, B, of stove furnaces, substantially as and for the purposes set forth.

5th, I claim in combination with the front plate, D, of stove furnaces, a fire or guard plate, E, when arranged in position above the aforesaid located fuel doorway, B, of the fire box thereof, and about opposite the combustion or flame chamber, C, substantially as and for the purposes set forth.

6th, I claim the arrangement of the front plate, D, of stove furnaces, in an inclined or slanting position, in combination with the aforesaid located fuel doorway, B, such as to overhang the combustion or flame chamber, C, and fire box thereof, substantially as and for the purposes set forth.

7th, I claim the combination of the aforesaid located fuel doorway, B, the fire box, A Y, the combustion or flame chamber, C, and the lever feeder, F, as applied to stoves, to operate in manner substantially as and for the purposes herein described.

8th, I claim the peculiar manner or method of feeding or introducing fresh fuel directly into the fire box of stove furnaces, by forming for its reception clear vacant room or places in, below, and between ignited fuel or live coke therein, by the conjoint means substantially of a feed aperture or doorway. B, located as described, and of a feed lever, F, or equivalents therefor, operating substantially as herein set forth, for the aforesaid purposes.

45,061.—HARVESTING MACHINE.—David J. Marvin, Stockton, Cal. Dated Nov. 15, 1864. Application for reissue received and filed Sept. 9, 1867.

1st, In a combined header and thrasher, I claim so pivoting or hinging the cutter frame upon the main axle, a, that it can be moved longitudinally, and also raised or lowered at pleasure, substantially as and for the purpose specified.

2d, In a combined header and thrasher, having its cutter frame mounted or hinged as above described, I claim the combination and arrangement of the bar, a', posts, b' b', pulley, d', cord, c', and crank rod, N, substantially as and for the purpose herein set forth.

3d, In a combined header and thrasher, I claim the arrangement of the cutter bar and apron, 2, running crosswise of the machine, in combination with the arrangement of the thrashing and winnowing apparatus running lengthwise of the machine, for the purpose of greater convenience and compactness, and in the manner substantially as shown.

4th, In a combined header and thrasher, I claim elongating the axle, a, so as to place the wheel, O, at a considerable distance from the main frame of the machine, to afford room for the attachment of the header frame between said wheel and main frame.

5th, I claim the combination of the levers, i and 1, with the sliding header frame and the gear wheels, c and b, for the purpose of throwing the header apparatus into and out of gear, substantially as shown and described.

6th, I claim the swinging axle, a, in combination with the gear wheel, b', pinion, Q, and lever, A, for throwing the thrashing apparatus into and out of gear, substantially as described.

9,653.—WEAVING CORDED FABRICS.—William Smith, New York city. Dated April 5, 1853. Extended April 5, 1867. Reissue No. 2,656, dated June 18, 1867. Application for reissue received and filed Sept. 10, 1867. Division A.

I claim the process herein specified of weaving, consisting in the use of stationary warps in combination with moving warps and filling that incloses such stationary warps, substantially as set forth.

9,653.—WEAVING CORDED FABRICS.—Wm. Smith, New York city. Dated April 5, 1853. Extended April 5, 1867. Reissue No. 2,656 dated June 18, 1867. Application for reissue received and filed Sept. 10 1867. Division B.

I claim the fabric specified, the same being formed with center warps, inclosed by the weft threads that are held upon the surface of the center warp

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by the interlocking of the movable warps between the center warps, thereby causing the weft threads to be pressed tightly upon the center warp.

9,653.—WEAVING CORDED FABRICS.—Wm. Smith, New York city. Dated April 5, 1853. Extended April 5, 1867. Reissue No. 2,656 dated June 18, 1867. Application for reissue received and filed Sept. 10, 1867. Division C,

I claim the heddle or its equivalent for supporting the stationary central warps, in combination with mechanism substantially as set forth, for performing the weaving.

64,761.—EYELETING MACHINE.—Wm. N. Ely, Stratford, Ct., assignee by mesne assignments of Luther Hall, Boston, Mass. Dated May 14, 1867. Application for reissue received and filed Sept. 9, 1867. Division A.

1st, I claim a movable head or carrier, in combination with the punch and set, or either of them, constructed, arranged, and operating substantially as described.

2d, A head or carrier so constructed and operated as to allow the punch and set to be alternately depressed by the same lever, substantially as described.

3d, So constructing the mechanism that the punching table and setting bed shall reciprocate laterally and alternately occupy the same place, substantially as and for the purposes described.

4th, The reciprocating punching bed in combination with a stationary work supporting table, when constructed and arranged so as to be moved to and from the punch, and under the material, substantially as described.

5th, Adjusting the length of the set or punch, or both, substantially as described.

6th, The striking lever, so constructed and arranged as to cause the set to pick up the eyelet while the pupch is making the hole for its reception, substantially as described.

7th, The setting die, so constructed and operating as to pick up the evelets from the chute, and present them to the place of insertion, substantially as described.

8th, The reciprocating solid and solid-pointed setting bed, constructed, arranged, and operated automatically, substantially as described.

9th, Feeding the material forward by means of the setting bed or holding point, substantially as described.

10th, Providing the set with spring pistons, substantially as described.

11th, The hopper for holding the eyelets, in combination with agitating devices, and the adjustable chute with its enlarged receptacle or dish, constructed and arranged substantially as described.

12th, The combination of parts by which the setting bed and the feeding point are operated and controlled substantially as described.

64,761.—EYELETING MACHINE.—Wm. N. Ely, Stratford, Ct., assignee by mesne assignments of Luther Hall, Boston, Mass. Dated May 14, 1867. Application for reissue received and filed Sept. 9, 1867. Division B.

1st, I claim a feeding instrument which engages with the work, feeds forward, and disengages, in combination with a punch or set, or both, substantially as described.

2d, A presser foot for holding the work to the table, in combination with a punch or set, or both, substantially as described.

3d, The spring presser foot, in combination with the feeding mechanism, arranged and operating with an eyeleting mechanism substantially as described.

4th, An adjustable work feeding mechanism, in combination with the mechanism for punching and eyeleting, substantially as described.

5th, Punching the holes, supplying, inserting, and setting the eyelets, spacing the distances, holding and feeding forward the work automatically, substantially as described.

64,761.—EYELETING MACHINE.—Wm. N. Ely, Stratford, Ct., assignee by mesne assignments of Luther Hall, Boston, Mass. Dated May 14, 1867. Application for reissue received and filed Sept. 9, 1867. Division C.

1st, I claim a hopper for holding the eyelets, constructed with lateral openings for the same, substantially as described.

2d, A chute for receiving the eyelets from the hopper and delivering them to the setting mechanism, substantially as described.

3d, Making the chute adjustable to eyelets of different sizes, substantially as described.

4th, The hopper and chute in combination with the set, when constructed and arranged substantially as described.

5th, Constructing the set so as to adapt it to eyelets of different sizes, substantially as described.

64,761.—EYELETING MACHINE.—Wm. N. Ely, Stratford, Ct., assignee by mesne assignments of Luther Hall, Boston, Mass. Dated May 14, 1867. Application for reissue received and filed Sept. 9, 1867. Division D.

1st, I claim the combination of carrier, D, with punch, E, and set, F, or either of them, constructed, arranged, and operating substantially as described.

2d, The combination of carrier, D, with both punch, E, and set, F, or either of them with lever, K, constructed, arranged, and operating substantially as described.

3d, The combination of carrier, D, with both punch, E, and set, F, or either of them, lever, K, and cam, L, constructed, arranged, and operating substantially as described.

4th, The combination of carrier, D, set, F, and setting bed, S, substantially as described.

5th, The combination of carrier, D, punch, E, and sliding plate, Q, substantially as described,

6th, The combination of carrier, D, punch, E, set, F, sliding plate, Q, and bed, S, substantially as described.

7th, The carrier, D, constructed, arranged, and operated substantially as described.

8th, The lever, K, constructed and operating substantially as described.

9th, The set, F, constructed substantially as described.

10th, The combination of levers, V and T, and pin, S, substantially as and for the purposes described.

11th, The combination of plates, Q and R, arranged and operated substantially as described.

12th, The combination of levers, V and T, pin, S, and screw, w, substantially as and for the purpose described.

13th, The combination of set, F, pins, a and b, and spring, d', substantially as described.

14th, The combination of lever, T, block, U, lever, V, and eccentric wheel, W, constructed, arranged, and operating substantially as described.

15th, The combination of hopper, B', agitator, e, and chute, A', constructed and arranged substantially as described.

16th, The combination of hopper, B', chute, A', groove, g', hole, h', and bottom, S', substantially as described.

17th, The combination of hopper, B', chute, A', dish, h', and set, F, substantially as described.

18th, The combination of sliding plates, Q and R, or either of them, with stationary table, A substantially as and for the purposes described.

19th, The combination of presser foot, N, spring, O, with both punch, E, and set, F, or either of them, and table, A, substantially as described.

20th, The combination of presser foot, N, and pin, S, arranged and operating substantially as described.

68,238.—HOOP SKIRT.—William Ryerson, Philadelphia, Pa. Dated Aug. 27, 1867. Application for reissue received and filed Sept. 10, 1867.

I claim an adjustment applied substantially as set forth to the tapes or vertical connections of a skirt, for the purposes set forth.

66,131.—FRAME FOR STRETCHING WET LEATHER.—Ichabod W. Dawson, Newark, N. J. Dated June 25, 1867, Application for reissue received and filed Sept. 11, 1867. Division A.

1st, I claim the combination of means for supporting the center of the hide, with means for stretching the same breadthwise over the said support, substantially as described

2d, The combination of means for supporting the center of the hide with means for stretching the same breadthwise and lengthwise over the said support, substantially as described.

66,131.—FRAME FOR STRETCHING WET LEATHER.—Ichabod W. Dawson, Newark, N. J. Dated June 25, 1867. Application for reissue received and filed Sept. 11, 1867. Division B.

I claim the process substantially as herein described of stretching leather or hides.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to MUNN & CO., Solicitors of Patents, 37 Park Row, N. Y.*

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,324.—BLOWER FOR FURNACES, ETC.—Benj. F. Sturtevant, West Roxbury, Mass. Aug. 13, 1867.

2,090.—BRUSH.—Henry Rosenthal, New York city. July 16, 1867.

2,237.—METHOD OF AND APPARATUS FOR CLARIFYING SUGAR, ETC.—Benjamin Lawrence and Phineas Lawrence, New York city. Aug. 2, 1867.

2,251.—HARROW.—Halsey H. Monroe, Rockland, Me. Aug. 3, 1867.

2,255.—FELTING MACHINE.—James S. Taylor, Danbury, Conn. Aug. 3, 1867

2,290.—PRINTING PRESS.—Edwin Allen, Norwich, Conn. Aug. 8, 1867.

2,293.—CASE OR BOX FOR HOLDING TWINE OR CORD.—Frederick J. Seymour, New York city. Aug. 9, 1867.

2,295.—KNIFE AND FORK.—Wm. J. Miller, New York city, and Frederick J. Miller, Brooklyn, N. Y. Aug. 9, 1867.

2,296.—MACHINERY FOR THE MANUFACTURE OF CUT NAILS.—John H. Geary, Fairhaven, Mass. Aug. 9, 1867.

2,308.—PROCESS FOR REMOVING SULPHUR, PHOSPHORUS, AND OTHER IMPURITIES FROM IRON, STEEL, AND OTHER METALS.—John F. Bennett, Pittsburg, Pa. Aug. 12, 1867.

2,345.—MACHINE FOR CLEANING BARRELS OR CASKS.—Jonathan Peacock, Rockford, Ill.—Aug. 15, 1867.

2,276.—EYELET AND PAPER FASTENER COMBINED.—Edward Boynton, New York City. Aug. 7, 1867.

2,319.—CENTRIFUGAL APPARATUS FOR WASHING SUGAR.—George E. Evans, Boston, Mass. Aug. 13, 1867.

2,335.—FASTENING FOR SECURING BAYONETS OF FIRE-ARMS.—Paul A. Oliver, New York city. Aug. 14, 1867.

2,353.—COTTON BALE TIE.—John W. Hedenberg, Chicago, Ill. Aug. 14, 1867.

2,368.—CONSTRUCTION OF MOLDS FOR CASTING ALUMINUM PLATES FOR ARTIFICIAL TEETH, ALSO METHOD OF CASTING SAID PLATES, SECURING THE TEETH THEREIN, ETC.—James B. Bean, Baltimore, Md. Aug. 17, 1867.

2,420.—MANUFACTURE OF IRON AND STEEL, AND APPARATUS EMPLOYED THEREIN.—Virgil W. Blanchard, Bridport, Vt. Aug. 23, 1867.

2,421.—CONSTRUCTION OF CONCUSSION FUZES FOR THE EXPLOSION OF PROJECTILES.—Edward A. Dana, Brookline, Mass. Aug. 23, 1867.

EXTENSION NOTICES.

Mathew Stewart, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 3d day of January, 1854, for an improvement in floor plates of malt kilns, for seven years from the expiration of said patent, which takes place on the 3d day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of December, 1867.

R. P. Walker, of New York city, having petitioned for the extension of a patent granted to him the 20th day of December, 1853, for an improvement in machine for hulling and scouring coffee, for seven years from the expiration of said patent, which takes place on the 20th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of December next.

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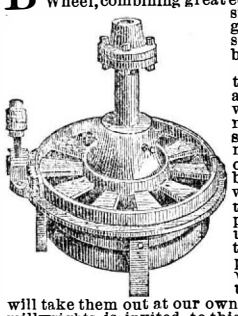

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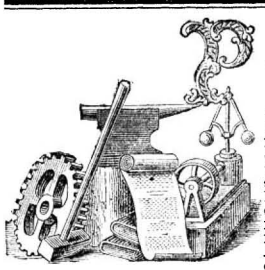

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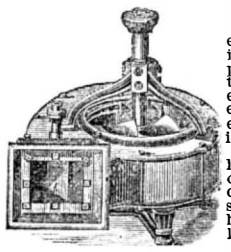

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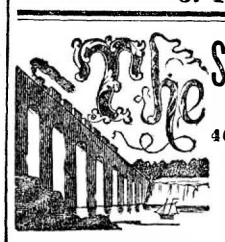

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